N60028_001055
TREASURE ISLAND
SSIC NO. 5090.3.A

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY (CLEAN II)
Northern and Central California, Nevada, and Utah
Contract Number N62474-94-D-7609
Contract Task Order 0151

Prepared For

DEPARTMENT OF THE NAVY
Ernesto Galang, Remedial Project Manager
Engineering Field Activity West
Naval Facilities Engineering Command
San Bruno, California

NAVY RESPONSES TO AGENCY COMMENTS ON THE DRAFT FINAL ONSHORE REMEDIAL INVESTIGATION REPORT NAVAL STATION TREASURE ISLAND SAN FRANCISCO, CALIFORNIA

July 30, 1999

Prepared By

TETRA TECH EM INC.
135 Main Street, Suite 1800
San Francisco, CA 94105
(415) 543-4880

CONTENTS

In Order of Appearance:

1. Response to U.S. Environmental Protection Agency Comments on the Draft Final Onshore Remedial Investigation Report

2. Response to Regional Water Quality Control Board Comments on the Draft Final Onshore Remedial Investigation Report

3. Response to California Department of Fish and Game Comments on the Draft Final Onshore Remedial Investigation Report Appendices J and O

4. ~~Response to Regional Water Quality Control Board Comments on the Draft Final Onshore Remedial Investigation Report~~

5. Response to Department of Toxic Substances Control Comments on the Draft Final Onshore Remedial Investigation Report

6. Response to DTSC-HERD Comments on Volume 1 of the Draft Final Onshore Remedial Investigation Report

7. Response to DTSC-HERD Comments on Volume 2 of the Draft Final Onshore Remedial Investigation Report

8. Response to DTSC-HERD Comments on Volume 3 of the Draft Final Onshore Remedial Investigation Report

9. Response to DTSC-HERD Comments on Volume 4 of the Draft Final Onshore Remedial Investigation Report

10. Response to DTSC-HERD Comments on Volume 5 of the Draft Final Onshore Remedial Investigation Report

11. Response to DTSC-HERD Comments on the Draft Final Onshore Remedial Investigation Report Appendices J and O

RESPONSE TO U.S. ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE DRAFT FINAL ONSHORE REMEDIAL INVESTIGATION REPORT, NAVAL STATION TREASURE ISLAND SAN FRANCISCO, CALIFORNIA

This document presents the Navy's responses to comments from the U.S. Environmental Protection Agency (EPA) on the draft final onshore remedial investigation (RI) report for Naval Station Treasure Island (NAVSTA TI) dated September 1997. The comments are dated December 19, 1997.

GENERAL COMMENTS

1. Comment: A. Overall Organization of the Document

It is very clear from reviewing the subject document that the Navy has invested a significant expenditure of human and financial resources in the investigation and characterization of the facility. Unfortunately, what is not consistently clear is the presentation of tables and other supporting data relative to specific discussions in the text. In general, EPA found it particularly difficult, at times, to locate the supporting data for activities discussed in the text. This was particularly the case in our review of the executive summary. The executive summary must be comprehensive and lucid. Moreover, it should be organized in a way that introduces the public to the purpose and issues, conclusion and recommendations that are discussed in greater detail in the text. In this regard, EPA has generated a few comments and developed specific recommendations that we believe will enhance the overall organization of the document relative to more lucid integration of text and tables. Given that these comments are more editorial than technical in content, EPA recommends a brief teleconference between the Navy, EPA and Cal/EPA to expeditiously address and obtain closure regarding these concerns.

Response: There have been numerous meetings and discussions between the Navy and the regulatory agencies concerning the RI at NAVSTA TI since submittal of the draft final RI report. In addition, several investigations have been performed at NAVSTA TI to address agency concerns, and groundwater monitoring has continued. The final RI report will be revised to incorporate results of the additional investigations and respond to agency comments on the draft final RI report. The resulting final RI report will be significantly revised from the draft final version and should address EPA's comment on overall organization and presentation of data.

2. Comment: B. Ambient or Background for Metals

As a result of EPA's review of Appendix O and F *"Estimation of Background and Ambient Metals Concentrations in Soils,"* and recent Base Realignment and Closure (BRAC) Cleanup Team (BCT) discussions, clarification is warranted regarding the issue of calculating background for metals, particularly in circumstances where metals are to be eliminated as chemicals of concern if 10% or fewer of the site concentrations exceed the background concentrations. It is the Agency's understanding based upon a review of BCT minutes and other documentation that the NSTI BCT at an April 1997 meeting specifically agreed to use the "10%" level as an acceptable screening tool for risk assessment. In order to ensure consistency relative to previous agreements and to preclude confusion of this issue for NSTI

Restoration Advisory Board (RAB) as well as the general public, EPA recommends that this issue be discussed at the January 1998 BCT in order to clarify and reaffirm the previous agreement. Towards this end, we have attached a document from the April 1997 BCT meeting which discusses this issue and confirms the agreement.

Finally, EPA notes that the NSTI RAB has generated a significant number of very salient comments regarding the draft final RI. After reviewing the most recent RAB comments, the Agency is willing to meet with interested RAB members, in conjunction with the Navy and Cal/EPA, to discuss their concerns in detail. It is our contention that the draft RI contains considerable site characterization data that addresses the RAB's concerns.

Response: The use of the 10 percent level as an acceptable screening tool for risk assessment was agreed upon at the April 1997 meeting between EPA's remedial project managers and the Base Realignment and Closure (BRAC) cleanup team (BCT). The methodology for estimating ambient metals levels and the 10 percent screening level for risk assessment were developed by the Navy in close consultation with EPA, the California Department of Toxic Substances Control, and the Regional Water Quality Control Board (RWQCB). The Navy does not intend to revise the approach for evaluating background levels for metals at this time and will continue to assess background levels for metals based on previous agreements.

The Navy will submit written responses to RAB comments on the draft final RI report. The Navy has continued efforts to address any outstanding RAB concerns and appreciates EPA's willingness to meet with interested RAB members to address these concerns.

SPECIFIC COMMENTS

1. **Comment:** **It currently appears that the Basin Plan does designate the groundwater at TI as a potential domestic/municipal source. While the committee report does recommend a change of designation, I assume that the State will hold to the fact that the groundwater is still a potential drinking water source. The Navy needs to state that it disagrees with the State's current designation and that it considers the groundwater not to be a drinking water source, or else MCLs will apply. Chemical specific ARARs applicable to groundwater such as the Water Board's Resolutions 88-63, 92-49 and 68-16 and the Basin Plan must be discussed, and the Navy and the State need to come to "agree to disagree language" with the State. I am attaching relevant portions of language from the Hunters Point Parcel B ROD in which this same issue was addressed.**

Response: Section 2.5.1 of the draft final RI report states the following:

> RWQCB recently completed a pilot beneficial-use designation project for several groundwater basins in San Francisco and northern San Mateo Counties, including basins at TI and YBI (RWQCB 1996). The project report indicates that the use of groundwater for municipal and domestic supply at TI would be limited by (1) the small volume of fresh groundwater available, (2) the likelihood of saltwater intrusion, and (3) potential future ground improvements for stability (such as addition of stone columns and dynamic compaction). Consequently, the report recommends that the basin

plan be revised to no longer designate groundwater at TI as a potential municipal or domestic water supply source, but retain designation of groundwater for potential agricultural, process, and industrial supply use.

The Navy does not consider groundwater at Treasure Island (TI) to be a drinking water source; therefore, drinking water applicable or relevant and appropriate requirements do not apply. This position is supported by the RWQCB staff report on groundwater beneficial uses (RWQCB 1996). The Navy and regulatory agencies are currently discussing the method for addressing beneficial uses of groundwater at TI.

2. **Comment:** **There appears to two identical Table 4-1 and Table 4-2 in the ARARs discussion. One set of the Tables should be deleted.**

Response: One set of the tables has been deleted.

3. **Comment:** **Citation to the Coastal Zone Management Act in the ARARs Table should also cite to the California Public Resources Code, section 1451 et seq which is the State Coastal Management Plan. The approved coastal zone management program for the San Francisco Bay includes the McAteer Petris Act and the San Francisco Bay Plan and is administered by the San Francisco Bay Conservation and Development Commission. The goals of the Bay Plan are to reduce fill and disposal of dredged materials and to maintaining the water quality and ecological integrity of the Bay. The Navy should coordinate with BCDC to make its consistency determination.**

Response: The Navy is currently coordinating with the San Francisco Bay Conservation and Development Commission regarding this issue.

REFERENCES

Regional Water Quality Control Board (RWQCB). 1996. "San Francisco and Northern San Mateo County Pilot Beneficial Use Designation Project Part I: Draft Staff Report." RWQCB Groundwater Committee. April 4.

RESPONSE TO REGIONAL WATER QUALITY CONTROL BOARD COMMENTS ON THE DRAFT FINAL ONSHORE REMEDIAL INVESTIGATION REPORT, NAVAL STATION TREASURE ISLAND SAN FRANCISCO, CALIFORNIA

This document presents the Navy's responses to comments from the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) on the draft final onshore remedial investigation (RI) report for Naval Station Treasure Island (NAVSTA TI), dated September 1997. The comments were received from RWQCB on December 19, 1997.

GENERAL COMMENTS

1. **Comment:** **For a number of sites, the results of the Remedial Investigation (RI) indicate that the only chemicals of concern are petroleum hydrocarbons, and that these sites will be addressed under the Navy's UST program. Please provide a plan and schedule for integrating these sites into the UST program and the corrective action planning process.**

   Response: Total petroleum hydrocarbons (TPH) are the only chemical of concern at Sites 05, 09, and 17. These sites will be included in the draft final corrective action plan under the Navy's underground storage tank (UST) program.

2. **Comment:** **The document uses the TPH screening levels proposed in Appendix N as the basis for conclusions regarding the need for further action with respect to petroleum hydrocarbon contamination. These values are still under review by RWQCB staff and have not been agreed upon. Consequently, any changes to the screening values will require reanalysis of environmental data at the sites addressed in this report to confirm the appropriateness of conclusions developed. Comments on Appendix N will be provided under separate cover at a later date.**

   Response: Comment noted.

3. **Comment:** **The exposure of human receptors to site contaminants via ingestion of fish exposed to site contaminants is addressed in a cursory and perfunctory fashion. Please provide a more complete and detailed description of how this pathway, which appears to be complete, will be addressed.**

   Response: At the human health risk assessor's meeting held on September 14, 1995, the Navy, U. S. Environmental Protection Agency (EPA), California Department of Toxic Substances Control (DTSC), and RWQCB agreed that there is no quantitative way to determine to what extent NAVSTA TI operations have contributed to contaminant levels in fish in San Francisco Bay. It was further agreed that the California Environmental Protection Agency (Cal/EPA) studies of health effects associated with ingestion of fish caught in San Francisco Bay would be summarized in the baseline human health risk assessment (BHHRA) to qualitatively assess this pathway for NAVSTA TI. This agreement was confirmed at the Remedial Project Mangers and Base Realignment and Closure (BRAC) Cleanup Team (RPM/BCT) meeting held on November 6, 1995, and the human health risk assessor's meeting held on April 4, 1997. Consistent with these agreements, the health advisories on fish consumption published by Cal/EPA are summarized in the draft final RI report.

4. **Comment:** **The presentation of the groundwater modeling results in the text is inconsistent and confusing. For some sites, results are summarized in the ecological risk assessment. For other sites, the results are summarized in the description of the nature and extent of chemicals of concern. The latter does not appear appropriate, as the groundwater modeling leads from COPCs to COCs. The document should be reviewed for consistency of presentation of the summaries of groundwater modeling results.**

Response: The final RI report will be revised so that the groundwater modeling results are presented in the ecological risk assessment section for all sites.

5. **Comment:** **The issue of point of compliance and appropriate criteria for assessing the significance of elevated concentrations of chemicals in groundwater needs to be discussed as part of the overall monitoring strategy for Treasure Island.**

Response: Since marine organisms are only exposed to contaminants in NAVSTA TI groundwater beyond the shoreline, the shoreline was used as the most conservative point of compliance in determining ecological chemicals of concern (COC) through groundwater modeling. A discussion of the point of compliance will be included in Appendix M of the final RI report, "Contaminant Fate and Transport Modeling." A description of the criteria used to select constituents for modeling and determining COCs is already presented in Appendix M.

SPECIFIC COMMENTS

1. **Comment:** **Section 2.5.1.3, p. 2-9. Does the Navy have any observations or explanations for the high values of TDS measured at a number of locations well inland of the estimated extent of tidal influence? Examples include wells 20-MW01, 24-MW03, and several wells at Site 25.**

Response: Total dissolved solids (TDS) present in the thin lens of fresh groundwater at NAVSTA TI are presumably derived from tidal mixing at the bay margin and from mixing with underlying brackish water. The variation in TDS concentrations at inland areas, shown on Figure 2-14, may be due to variation in mixing with underlying brackish water. It should also be noted that the November 1995, groundwater sampling event was conducted over the period of 1 week, which may also account for some variation in the TDS concentrations shown on Figure 2-14. The TDS sampling was performed primarily to define the extent of potential potable groundwater (less than 3,000 milligrams per liter TDS) present at NAVSTA TI. Studies to clarify the TDS regime in groundwater at NAVSTA TI do not appear to be necessary. Since this explanation is speculative and the issue is not critical, no changes to the text are proposed.

2. **Comment:** **Section 2.9 and Figure 2-19. Please verify that Figure 2-19 addresses only onshore RI sites at TI and YBI. The note on the figure stating that the ingestion of fish is evaluated using non-site-specific data is misleading, as noted in the following comment. Note also that in subsequent sections this figure is referenced as Figure 2-17.**

Response: Comment noted. Please see response to general comment number 3.

3. **Comment:** **Section 3.7.3.2, p. 3-35. The discussion of exposure to fish caught in the bay is more akin to a literature review and does not constitute even a qualitative evaluation of potential risks associated with Navy activities via this pathway. This exposure pathway appears to be complete. The Navy needs to provide a more thorough, site-specific, quantitative evaluation of the risks associated with exposure of humans to site contaminants via fish in the bay.**

Response: Please see response to general comment number 3.

4. **Comment:** **Section 4.1. The beneficial uses of groundwater for freshwater replenishment is not addressed in this section. In addition, the ARARs evaluation for the IR sites is inadequate in the State Water Resources Control Board Resolutions 68-16 and 92-49 are missing. The regulations pertaining to waste discharges to land which may threaten water quality presented in Title 23, Division 3, Chapter 15 of the California Code of Regulations (CCR) also are not evaluated. Please revise this section to include these ARARs.**

Response: The Navy will evaluate the cited applicable or relevant and appropriate regulations for inclusion in Section 4.1 as appropriate.

5. **Comment:** **Section 4. The Navy notes that agency advisories, criteria, and guidance may be considered for particular releases, and notes a Cal/EPA advisory regarding consumption of fish from the bay in Section 3.7.3.2, but has not provided an evaluation of this advisory as an ARAR or TBC in Section 4. Please provide an evaluation of this advisory.**

Response: Please see response to general comment number 3.

6. **Comment:** **Section 7.5.2, p. 7-7. The contour maps for this site suggest that Site IR-5 is upgradient of Site IR-17, not downgradient. Please review and revise the text as appropriate.**

Response: The text will be corrected to read upgradient.

7. **Comment:** **Section 7.9.2, p. 7-20 and Section 7.11, p. 7-22. Please provide additional detail regarding approach and schedule for investigation and removal of petroleum hydrocarbons under the Navy's UST program.**

Response: Site 05 will be included in the draft final corrective action plan under the Navy's UST program. This will be clarified in Section 7.11 of the final RI report.

8. **Comment:** **Section 8.10.2, p. 8-26. Could the Navy provide some references or other supporting material regarding the important processes affecting the distribution of metals in groundwater?**

Response: Chemical characteristics of metals are included in Appendix L, "Principles of Chemical Fate and Transport." Details of the fate and transport of copper, mercury, nickel, and zinc from Appendix L will be added to Section 8.10.2.

9. **Comment:** **Section 9.2, Figure 9-1. Please check that the Caltrans boring locations are shown on the figure and add them if they are not represented.**

Response: CalTrans boring symbols will be added to the legend.

10. **Comment:** **Section 9.6.2, p. 9-7. The Navy concludes that based on the results of a TCLP test that DDT, DDD, and DDE are not mobile. The TCLP provides information on leachability of the compounds tested, and may be used to infer something regarding mobility in a dissolved phase. This test, however, would provide no information on the mobility of these compounds if adsorbed to sediment and moving as a suspended phase.**

Response: The toxicity characteristic leaching procedure (TCLP) analysis was performed to assess the potential for chlorinated pesticides in Site 08 soils to leach to groundwater. While there is low probability of leaching from soils to groundwater, the Navy agrees that there is a potential for chlorinated pesticides sorbed to surface soils to become suspended in surface water runoff. This will be clarified in the text.

11. **Comment:** **Section 9.6.3, pp. 9-7 and 9-8. The Navy's conclusion that no further evaluation or sampling of storm water runoff is required at this site does not seem warranted. The need for further evaluation is indicated by the presence of 4,4'-DDT in the only runoff sample collected at this site, and by the presence of DDT in a Phase 1 sediment sample collected immediately adjacent to the site (one of only two samples where DDT was detected in offshore sediment, as presented in PRC, Phase II Ecological Risk Assessment Final Work Plan, April 10, 1997). In addition, what is the rationale for comparing the DDT detection to an instantaneous maximum value, as opposed to other available criteria?**

Response: The paragraph will be revised to include the evaluation of any recent storm water sampling information available for storm water outfalls where surface water from Site 08 discharges to the bay. Similar to groundwater sample results, surface water sample results are screened against the ambient water quality criteria (AWQC) to identify contaminants of potential concern.

12. **Comment:** **Section 11.9.3, p. 11-31, last paragraph. While the presentation of a concentration map does not in itself constitute or imply a problem, the repeated exceedances of AWQC in water samples collected at the site are of concern. The distinction drawn between analyte concentration maps and contaminant plume maps is not clear; addition of isoconcentration lines to an analyte concentration map is not the same as comparison to a regulatory level or cleanup level. It would seem that either method of data presentation (analyte values or plume maps) can be compared to criteria of interest. In fact, the analyte data presented are compared to AWQC.**

Please clarify what is meant by the statement that reported concentrations are relative; relative to what? Also, please clarify what is meant by the statement that many maps are included for analytes that do not appear to be a problem. For each of the 7 metals plotted, there are AWQC exceedances. Are some of these not proposed for evaluation in the FS proposed for this site? If so, please state which ones and provide a rationale.

Response: The third paragraph of Section 11.9.3 will be deleted. The Navy began collecting filtered groundwater samples in 1998. Lead and nickel were the only analytes not detected in filtered groundwater samples at concentrations exceeding the AWQC during 1998 groundwater sampling at Site 11. Evaluation of the 1998 groundwater data will be included in the final RI report.

13. **Comment:** **Section 11.9.3, Figure 11-15. Please check the notations on this figure of AWQC exceedances; it appears that well 11-MW02 should be indicated with an asterisk.**

Response: An asterisk will be added to well 11-MW02 on Figure 11-15.

14. **Comment:** **Section 11.10.1, p. 11-34. RWQCB staff concur that this unengineered landfill is acting as a continuing source of contaminants to groundwater, and most likely to the bay as well.**

Response: Comment noted.

15. **Comment:** **Section 11.11, p. 11-35. How and when will coordination and integration of the data generated from this investigation and the data generated from the UST investigations near and within this site occur?**

Response: All available and relevant data from the UST program activities around Site 11 will be incorporated into the final RI report.

16. **Comment:** **Section 12.5, p. 12-9, last paragraph and Section 12.5.1, p. 12-10. Please explain or clarify the discrepancies between the hydraulic conductivity values presented in these two locations.**

Response: Responses to all Site 12 comments can be found in Appendix R of the draft Site 12 Operable Unit (OU) RI report, dated June 1, 1999.

17. **Comment:** **Section 12, Figure 12-10. Please check this figure for completeness and accuracy. It appears that some hydropunch data for the sampling period represented on the plot (August-November 1995) are not included. See for example concentrations of TPH-diesel at 12-HP027 and 12-HP076 from samples collected in September and October 1995.**

Response: Responses to all Site 12 comments can be found in Appendix R of the draft Site 12 OU RI report, dated June 1, 1999.

18. **Comment:** **Section 13.9.2, p. 13-20. The uncertainty with regard to the extent of contamination at this site is noted. How and when will this uncertainty be addressed?**

Response: While the extent of TPH in soil is not fully defined by laboratory analytical data, the TPH-immunoassay data provides further information on the extent of TPH in soils. Regardless of the extent of TPH in soil, the impacts to groundwater appear to be minimal. The highest concentrations of TPH detected in well 17-MW01, directly downgradient of Tanks 103 and 104, was 0.62 milligrams per liter. Well 17-MW01 will be sampled and analyzed for TPH-extractable and volatile organic compounds (VOC) under the NAVSTA TI interim groundwater monitoring program. Should concentrations of TPH in well 17-MW01 increase with time, additional characterization may be necessary under the Navy's UST program.

19. **Comment:** **Section 13, Figure 13-4. It appears that results for 17HP05 are missing from this figure.**

Response: The TPH-immunoassay results for 17-HP05 are shown on Figure 13-4. No changes are proposed for the figure.

20. **Comment:** **Section 13.11, p. 13-22. No conclusions or recommendations for beryllium are presented. Please clarify.**

Response: Since there is no known source for beryllium at Site 17, the source of beryllium is likely related to the presence of metals in artificial fill material, and therefore, no further action under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) is proposed. This will be clarified in the text.

21. **Comment:** **Section 14.9, p. 14-18. Please provide a rationale for dismissing chlorinated solvents in the absence of specific criteria. Please provide a rationale for the use of unadjusted acute criteria for TCE in the absence of chronic criteria. Chronic criteria for PCE are over 20 times lower than acute criteria for PCE. It seems appropriate to use a similar factor as a point of comparison for chronic effects of TCE on aquatic receptors.**

Response: The Navy prefers to use only established AWQC which are based on risk to aquatic receptors. The Navy is unaware of any published literature providing evidence for chronic ecological risk from trichloroethene (TCE). Consequently, there does not appear to be an ecological risk-based rationale to develop a chronic AWQC for TCE. No changes to the text are proposed.

22. **Comment:** **Section 15.5.1, p. 15-9. The high measured hydraulic conductivity at well 24-MW03 may not be anomalous but may represent a preferential pathway at this site. Using the lower value of conductivity measured at 24-MW02 may underestimate groundwater velocities.**

Response: Well 24-MW02, which has a hydraulic conductivity value of 7.97 feet/day, is currently used as the representative value for Site 24. Of the 13 wells slug tested on NAVSTA TI, well 24-MW03 had a hydraulic conductivity value (86.3 feet/day) approximately one order of magnitude higher than all the other wells tested. As noted in the text, the anomalous hydraulic conductivity value is possibly due to the predominance of shells within the screened interval. Further, well 24-MW03 is on the southern border of Site 24 and is more than 500 feet crossgradient of the solvent plume. Wells 17-MW01 and 4/19-MW01, which are within Site 24, had hydraulic conductivity values of 11.49 and 5.08 feet/day, respectively. For all of these reasons, the conclusion that the hydraulic conductivity value for well 24-MW03 is anomalous appears justified, and no changes to the text are proposed.

APPENDIX M, RESPONSE TO REGULATORY AGENCY COMMENTS ON THE DRAFT RI REPORT, ADDENDUM NUMBER 1

SPECIFIC COMMENTS

1. **Comment:** **Response to Comment 2. Please identify those monitoring well locations between the inland edge of the tidally-influenced zone (point of compliance) and the shoreline where chemical concentrations exceed AWQC but where chemicals were not identified as COCs based on modeling results. Please also identify the chemicals.**

Response: Ten monitoring well locations and three hydraulic punch locations within the tidally-influenced zone (250 feet from shoreline) are identified Tables 4 and 5 of the Appendix M [Addendum 1]. Several constituents (primarily metals, phenanthrene, flouranthene, and ethylbenzene) from these wells and hydraulic punch borings exceeded AWQC but were not considered COCs since conservative modeling results indicated they would not reach the shoreline at concentrations exceeding AWQC. These well locations and constituents will be denoted in the text of the Appendix M to the final RI report.

2. **Comment:** **Response to Comment 4. While modeling of fuel mixtures as a whole is a simplification of complex processes, such modeling is not necessarily an oversimplification. This issue may need to be revisited once ecotoxicity values for TPH are agreed upon.**

Response: Comment noted.

APPENDIX O, RESPONSE TO REGULATORY COMMENTS ON THE DRAFT REMEDIAL INVESTIGATION REPORT

SPECIFIC COMMENTS

1a. **Comment:** **The Navy's response to the RWQCB's comment on Chapter 7 (Site IR-05) notes that MTBE is part of the VOC analytical suite, per the Interim Groundwater Monitoring Plan. Appendix C of the Interim Groundwater Monitoring Plan does not include MTBE. Please confirm that MTBE is part of the VOC analytical suite, and include a detection limit for MTBE.**

Response: Methyl-tert-butyl-ether is included in the VOC analytical suite; the detection limit is 0.5 micrograms per liter.

1b. **Comment:** **Navy's response to RWQCB's comment on Chapter 9, Site IR-08. See comments on Section 9.6.3.**

Response: Please see response to specific comment number 11.

RESPONSE TO CALIFORNIA DEPARTMENT OF FISH AND GAME COMMENTS ON DRAFT FINAL REMEDIAL INVESTIGATION REPORT APPENDICES J AND O NAVAL STATION TREASURE ISLAND SAN FRANCISCO, CALIFORNIA

This document presents the Navy's responses to comments from the California Department of Fish and Game (CDFG) provided by Ms. Susan Ellis on Appendix J, ecological risk assessment methodology and results, and Appendix O, responses to regulatory comments on the draft remedial investigation report, for Naval Station Treasure Island (NAVSTA TI), dated September 1997. The comments are dated November 25, 1997.

GENERAL COMMENTS

1. **Comment:** **In the section provided to me, I was not able to find the locations of the background samples, nor the rationale for selecting those locations. Since COPCs were eliminated because they were below background, I need to understand how background numbers were derived. In addition, the rationale for using the "10 percent level" as a screening tool for risk assessment is not clear to me. This methodology does not address the possibility of "hot spots" and is not acceptable to the Department.**

   Response: The methods employed to establish ambient and background concentrations are presented in Section 3.6 and Appendix F of the report. In summary, background values were determined for YBI based on inorganic data for 19 metals present in 21 soil samples collected as part of the undisturbed natural conditions of the area. Metals data from 200 soil samples collected at TI were used to determine the background concentrations of 19 metals present in soil altered by human activities, as is the case with land made of artificial fill.

   During the April 4, 1997 meeting concerning the human health risk assessment, the U.S. Environmental Protection Agency (U.S. EPA), DTSC, Regional Water Quality Control Board (RWQCB), and the Navy all agreed that the "10 percent" level was an acceptable screening tool for the risk assessment. Section 3.7.3.1 of the draft final RI report presents the rationale for using the 10 percent level as a tool to distinguish metals attributable to site-specific activities from background metals. It is noted that the CDFG does not prefer this approach for future ecological risk assessments.

2. **Comment:** **With respect to the use of Toxicity Reference Values (TRVs), it is the position of the Department that these numbers and this approach may not be wholly protective of fish and wildlife resources. The use of allometric conversions, high and low Hazard Quotients (and the interpretation of their meaning) and the need to screen out COPCs without TRVs from the overall analysis are some of our concerns.**

Response: The TRVs were developed as part of a collaborative approach between the Navy and the EPA Region 9 Biological Assistance Technical Group (BTAG). As a consensus-building technical panel, the group reviewed and discussed literature and agreed upon high and low TRVs for 20 chemicals based on the current available literature. It is the Navy's position that the use of TRVs is a technically sound and defensible approach to determine risk to receptors.

The Navy agrees that the use of species specific ingestion rate information is preferred to allometrically converted ingestion rate information for food-web modeling when available. However, in many cases species specific ingestion rates are not available in the literature; it is in these cases that the ingestion rate information is allometrically converted from a surrogate species with similar life history parameters.

The Navy's intended use of the HQ approach is to clearly identify sites posing significant risk and sites where there is little or no risk. This approach brackets the range of risk and allows the risk assessor to identify specific chemicals that present risk to the vertebrate receptors. The Navy acknowledges the approach's limitations in quantifying the level of risk in the "gray area" between the best- and worst-case scenarios.

Although TRVs could not be derived for all COPCs, where some data exist, a qualitative risk characterization was performed. For these COPCs, available toxicological data were graphed as doses to the test species in units of mg/kg-day. Site-specific high and low doses calculated for each receptor were then compared to the available toxicity data by placing the receptor-specific doses on the toxicity graphs. The available toxicological data were graphed as the dose to the test species and were not allometrically converted to a receptor-specific dose. Allometrically converted doses were not graphed on the figures because, in most cases, the quality of the literature-derived data was unknown. It was deemed, therefore, more appropriate to graph the data exactly as they were cited. The allometrically converted doses are presented, however, in the tables that accompany the figures (Appendix J). In almost all cases, the allometric conversions did not significantly increase or decrease (they were within the same order of magnitude) from the test species dose. It was considered appropriate to evaluate the potential risk qualitatively based on the relationship of the literature-derived test species data to the estimated site-specific dose.

3. **Comment:** **Another area of concern for the Department is the position of the Navy has taken with respect to protection of fish and wildlife resources which have no special legal status. As co-trustees for natural resources, it is the responsibility of the Navy, DTSC, and the Department to protect all trust resources. Individual mice and birds are such resources. In order to determine if these resources are being adversely impacted, tissue samples of individual mice should be analyzed and soil bioassays should be performed. In addition, it can not be inferred that population impacts from the loss of individual mice will be ameliorated by immigration from other sites.**

Response: See response to Department of Toxic Substances Control (DTSC) Human and Ecological Risk Division (HERD) general comment number 1 by Mr. James Polisini.

4. **Comment:** **We agree with the Navy that tissue sampling of Peregrine falcon prey items should be pursued. The Navy's approach, which was discussed in the November 4, 1997 conference call appears to be appropriate. I have been contacted by Ms. Kristin Gade and have supplied her with the information necessary to obtain a State Scientific Collector's Permit for the necessary specimens. I also contacted Mr. Jim Haas at the U.S. Fish and Wildlife Service to notify him of the Navy's intention to collect and kill migratory birds. He will advise Ms. Gade regarding the required federal permits.**

Response: The results of the validations study for Sites 11, 28, and 29 will be incorporated as an addendum to the Final RI report.

Specific Comments

1. **Comment:** **IR Site 08. Section 3.1.1.3 Summarizes the Risk at Site 08. This section should include a discussion of risk to receptors from pesticides found on site. A more thorough evaluation of the threat posed by pesticides may be necessary if the proposed reuse does not take place. In addition, as noted in the general comments, risk to individual rodents, is needed. It is premature to make a recommendation of "no further action" for this site.**

Response: Section 3.1.3 will be modified to include a discussion of risk to receptors from pesticides found on the site. See response to DTSC-HERD general comment number 1 by Mr. James Polisini as it relates to small mammals.

2 **Comment:** **IR Site 11. We do not believe that this site can be properly analyzed until the future reuse is determined. It is necessary for the Navy to determine if this landfill is historic wetland and if there is off-site migration of contaminants. This must be addressed in the Offshore RI. Although capping was mentioned during our November 4, 1997 conference call, it should not be considered a remedy without additional investigation. Section 3.1.2.3 indicates that quantitative evaluation could not conclusively determine if there may be some level of risk associated with the site. The statement should be that the quantitative evaluations could not conclusively determine that there is not risk to the site. Further investigation in the form of invertebrate bioassays could answer this question. It is premature to make a recommendation of "no further action" for this site.**

Response:

1. Comment noted. It is likely that there will be remedial action at Site 11, however, because the reuse plan for Treasure Island has not been finalized, to date no remedial action has been initiated. Site 11 is still under investigation for potential risk to the Peregrine Falcon. A discussion of risk to the Peregrine based on food-web modeling using site specific prey tissue will be incorporated into the final RI.

2. IR Site 11, the YBI Landfill, is an approximately 200-foot by 600-foot former marsh area on the southern side of the eastern tip of YBI. This site was identified as a dump in a 1935 topographic map. The exact dates of sanctioned landfill operation have not been established. Further research will be conducted to address whether Site 11 is historic wetland and will be incorporated into the Final RI report.

3. For the Offshore RI report, invertebrate tissue samples (worm and crab) were collected from the shoreline areas of Site 11 and bioassays were conducted. Tissue residue and bioassay results are discussed in that report (TtEMI 1999).

4. Section 3.2.2.3 will be amended in the Draft Final RI.

3. **Comment:** **IR Sites 28 and 29. Again, bioassays and rodent tissue analysis should be used to validate to conclusion that these sites do not appear to pose significant immediate risk to terrestrial receptors. It is premature to make a recommendation of "no further action" for these sites.**

Response: See responses to DTSC-HERD general comment number 1 and specific comment number 4 by Mr. James Polisini.

REFERENCES

Tetra Tech, EM Inc. (TtEMI). 1998. "Validation Study for Sites 11, 28, and 29 Final Work Plan/Field Sampling Plan Naval Station Treasure Island, San Francisco, California." Engineering Field Activity West, Naval Facilities Engineering Command, San Bruno, California. November.

TtEMI. 1999. "Draft Final Remedial Investigation Offshore Operable Unit, Naval Station Treasure Island., San Francisco, California." Engineering Field Activity West, Naval Facilities Engineering Command, San Bruno, California. March.

RESPONSE TO DEPARTMENT OF TOXIC SUBSTANCES CONTROL COMMENTS ON THE DRAFT FINAL ONSHORE REMEDIAL INVESTIGATION REPORT, NAVAL STATION TREASURE ISLAND SAN FRANCISCO, CALIFORNIA

This document presents the Navy's responses to comments from the Department of Toxic Substances Control (DTSC) on the draft final onshore remedial investigation (RI) report for Naval Station Treasure Island (NAVSTA TI), dated September 1997. The comments are dated December 19, 1997.

GENERAL COMMENTS

1. **Comment:** **The Navy seems reluctant to use the term "operable unit" in referring to the onshore portion of its basewide (comprehensive) cleanup program, "because separate onshore operable units may be formed at a later date." The potential subdivision of the onshore OU into several contiguous OUs, or the designation of additional operable units should not preclude the formal designation of the onshore operable unit pursuant to the National Contingency Plan: ". . . a discrete action that comprises an <u>incremental step</u> toward comprehensively addressing site problems . . . The cleanup of a site can be divided into a number of operable units, depending on the complexity of the problems associated with the site" (emphasis added).**

   Response: At present, the Navy believes there is no benefit to forming additional operable units (OU) for onshore sites at NAVSTA TI. Site 12 has been designated an OU.

2. **Comment:** **The report contains references to reports (both past and anticipated) and actions (e.g., fuel pipeline investigation/removal) that are not up to date. Please ensure that all such references are as current as possible.**

   Response: All cited references will be as current as possible.

3. **Comment:** **Early in the process of developing the workplan for this RI, the BCT discussed the fact that considering individual IR sites separately would not accurately reflect the extent of contamination. To this end, the BCT agreed on a grouping of IR sites, based on proximity, which would aid evaluation of contaminant distribution. This agreement was not adhered to in the Draft RI report, and meaningful maps are therefore still missing from the Draft Final report. In order to adequately (and accurately) display information needed to evaluate the nature and extent of contamination at NAVSTA TI, it is imperative that maps be generated which show all relevant data from adjacent IR sites. These maps may be contained in a separate summary chapter in order to facilitate report revision and production of the final report. Sites which require this evaluation include Sites 5/17/24A and Sites 6/12/20.**

   Response: Discussions summarizing the evaluation of contamination at Sites 5/17/24a will be included in the final RI report. Responses to all Site 12 comments can be found in Appendix R of the draft Site 12 OU RI report, dated June 1, 1999.

4. **Comment:** **The Navy recommends no action under CERCLA for several sites, due to the fact that groundwater at NAVSTA TI does not meet criteria for drinking water and has been recommended for dedesignation as drinking water beneficial use in a draft RWQCB Report, and that existing contamination does not exceed criteria for the protection of aquatic species. Designation by the RWQCB that an aquifer is not a source of drinking water may address a Regional Board ARAR, but does not satisfy the requirements of the California Health and Safety Code (Chapter 6.8) or CERCLA. If the Navy desires to propose cleanup levels other than those appropriate for unrestricted use, an institutional control (e.g., deed restriction) must be proposed as the remedy in a RAP/ROD and implemented as any other remedy. This also applies to sites where soil contamination does not pose an unacceptable risk under current conditions (e.g., IR Site 07), but may pose a risk if conditions change.**

Response: For installation restoration (IR) sites at NAVSTA TI, the Navy is considering proposing institutional controls (deed restrictions) as groundwater remedy. The use of institutional controls for soil will also be considered where applicable.

5. **Comment:** **It would be helpful if representative TPH chromatograms were included in an appendix so that the reader can evaluate the conclusions that certain samples contain various petroleum products (e.g., diesel, "weathered diesel," "oily waste," etc.). In addition, text referring to output traces from chromatographic analysis should be corrected to refer to <u>chromatograms</u>, not chromatographs (the analytical instrument).**

Response: The final RI report will include representative total petroleum hydrocarbon (TPH) chromatograms. Output traces from chromatography analysis will be referred to as chromatograms.

6. **Comment:** **The use of the term TPHi for results of immunoassay field screening for TPH is confusing, if not misleading, because similar terminology (TPHg, TPHd, TPHm) is used to identify classes of hydrocarbon compounds. DTSC recommends selecting a different designation to identify immunoassay field screening results.**

Response: The term TPH-I (immunoassay) accurately reflects the analysis, just as in the terms TPH-e (extractable) and TPH-p (purgeable). The term will not be changed but a comment will be added to better illustrate the differences in terminology.

7. **Comment:** **In cases where immunoassay was performed and selected samples sent to an offsite laboratory for confirmation, the text should read, "offsite analyses included [analytes]," not "offsite samples were analyzed for [analytes]."**

Response: The text will be revised as requested.

8. **Comment:** **Analytical Results figures: Note 1 on these figures states, "The figure only presents detected results. A blank space in the data table indicates that the analyte was not detected or was not analyzed." The note should be expanded to include information regarding sample locations that are shown by the appropriate symbol, but no data table is shown (i.e., all analytes were non-detect).**

Response: The figure note will be revised as requested.

9. **Comment:** **The Navy must ensure that NAVSTA TI has been adequately characterized with respect to soils that may contain lead from any source at levels which may pose a threat to human health and the environment. In many cases, this assessment may be made based on knowledge of building construction and maintenance practices, and the condition of the ground surrounding buildings, without the need for extensive additional sampling.**

Response: Currently the Navy and DTSC are continuing discussions of this issue for resolution prior to submittal of the final RI report.

SPECIFIC COMMENTS

1. **Comment:** **Section 1.4.1, Separation of Petroleum Sites From the Remedial Investigation: The designation of IR sites for corrective action under RCRA (CCR Title 23, Chapter 15) still requires monitoring for CERCLA substances to ensure that concentrations remain at or below CERCLA action levels. Should concentrations exceeding action levels be detected, cleanup pursuant to CERCLA (CA Health and Safety Code, Chapter 6.8) will be necessary. Please include language to this effect in this section.**

Response: Chemicals that are derived from refined petroleum products are exempt from the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and will be monitored and evaluated as part of the corrective action for petroleum sites. Chemicals that are not derived from refined petroleum products would be monitored and evaluated pursuant to CERCLA. This language will be included in this section.

2. **Comment:** **Figure 1-2, compared with Figure 12-1: Figure 1-2 indicates the former ammunition storage area, including a representation of the locations of former bunkers and apparent service roadways. This information is not exactly the same as information depicted on Figure 12-1. Specifically, the locations of former roadways may help provide insight into the distribution of contamination at Site 12. This information should be verified and evaluated for inclusion in the Site 12 additional investigation.**

Response: Responses to all Site 12 comments can be found in Appendix R of the draft Site 12 OU RI report.

3. **Comment:** **Chapter 4: Preliminary Identification of Applicable or Relevant and Appropriate Requirements: This chapter is deficient in the identification of potential ARARs. Several ARARs are missing that apply to the remedial investigation, and many are missing that may apply to remedial actions. Please revise this chapter using the enclosed table.**

Response: Where appropriate, the section will be revised using the table provided by DTSC. However, it is premature to include action-specific applicable or relevant and appropriate requirements (ARAR) at this time.

4. **Comment:** **Section 6.8, Conclusions and Recommendations (IR Site 03):**

   a. **The text states, "low concentrations of PCBs were detected in wipe samples collected in 1987 from stained asphalt areas." Please provide the data to support this statement.**

   Response: The data to support this statement was presented in Table 6-2 and discussed in Section 6.2 ("Previous Environmental Investigations"). Polychlorinated biphenyls (PCB) were detected in two of eight wipe samples collected in 1987.

   b. **The text states, "Two soil borings were drilled during the remedial investigation . . . to delineate potential soil contamination beneath the wipe sample locations." The sample location map (Figure 6-1) does not show borings collocated with wipe sample. Please clarify the relationship between wipe samples and boring samples.**

   Response: The wipe samples at Site 03 were collected inside Building 03. At the time soil borings 03-SB01 and 03-SB02 were drilled, Building 03 was still in use and soil samples could not be collected inside of the building. Instead, the soil borings were located close to the building in locations where oil-containing PCBs could have contaminated the soil as indicated by ground surface staining. The soil samples were not collected beneath the wipe samples, and the text will be amended to reflect this information.

5. **Comment:** **Figure 7-2, Organic Analytical Results for Soil and Water, IR Site 05: The depth for sample 05-TP03 is indicated as zero; however the sample was taken at the bottom of the test pit. Please correct.**

   Response: The figure will be corrected as requested.

6. **Comment:** **Chapter 7, IR Site 05: Upon evaluation of the information provided in this chapter, the reader might wonder why the second highest TPHd concentration (11000 mg/kg) is sixty feet from the fuel pipeline. The answer to this question is likely addressed in Chapter 13, which discusses adjoining IR Site 17 (Tanks 103 and 104). That chapter describes a release of 20,000 gallons of diesel fuel onto unpaved ground in 1983, before the berm was installed. This is an example of why adjoining sites must be considered together, as requested in General Comment #3.**

   Response: The section will be revised to interpret potential sources for the 11,000 milligram per kilogram (mg/kg) detection of TPH.

7. **Comment:** **Figure 9-1, Site Location Map, IR Site 08: Please add CalTrans borings to the legend.**

   Response: CalTrans boring symbols will be added to the legend.

8. **Comment:** **Section 9-5, Field Geology and Hydrogeology, IR Site 08: Please include geological information obtained from the CalTrans borings, as appropriate.**

   Response: Geological information from the CalTrans borings will be added as appropriate.

9. **Comment:** **Chapter 11: Please add missing text (pages 11-8/11-9).**

Response: The missing text will be included.

10. **Comment:** **Section 11.5.3, Groundwater Flow Patterns and Velocity, IR Site 11: The text states, "The reason for this anomalous [5.2 feet between May 1995 and November 1995] drop in water level was not determined." It would be helpful if the Navy would propose several explanations for this behavior, then rule out those that are incompatible with the known facts. The text does not indicate if measurement error was considered. The text further states, "The times that the November water level measurements were recorded are unavailable . . .." Please indicate if the times <u>were not recorded</u>, or if the information is lost or missing.**

Response: Possible causes of the anomalous 5.2-foot water level change observed in well 11-MW03 between May and November 1995 include measurement error and minimal groundwater recharge during the dry periods. Well 11-MW03 is farther inland (approximately 180 feet from the shoreline) and is screened deeper than the other Site 11 wells. Well 11-MW03 is screened from a depth of 21 to 31 feet below ground surface (bgs) in naturally occurring dense fine-grained sands and partially in Franciscan Sandstone; the other Site 11 wells are screened between 3.5 and 13.5 feet bgs in more permeable artificial fill. Well 11-MW03 is not tidally influenced and may be primarily recharged by infiltration of precipitation

during wet periods. The lack of recharge during the dry season may be one potential cause of the anomalous drop in groundwater observed in November 1995. In November 1994, the water level in well 11-MW03 was approximately 5 feet higher than the level measured in November 1995. The 5-foot difference in water levels between years may indicate a measurement error. These interpretations will be added to the text as well as interpretation of additional Site 11 groundwater level data collected in 1998.

The times of the November 1995 water level measurements were not recorded, and no correlation between the tidal phase and the water levels can be established. This information will be added to the text.

11. **Comment:** **Section 11.9.2.1, Organic Chemicals of Concern in Soils, IR Site 11: Please correct the figure reference for spatial distribution of PAH COCs. The text incorrectly references Figure 11-10, which is TPH Immunoassay Results.**

Response: The figure reference will be corrected as Figure 11-11.

12. **Comment:** **Section 12.1, Site Description and Operational History, IR Site 12:**

    a. **The text refers to "two additional former activities" at Site 12 that may have contributed to potential contamination. Please clarify if the "underground oil storage tank" is the same as the "Former Buried Oil Tank" noted on Figure 12-1. Please add the former air strip to figures.**

b. **Please include all relevant features such as "oil tank" site(s), rubbish disposal area(s), and landfill area(s) on all figures so that the reader can evaluate decisions to concentrate sampling in these areas, and the adequacy of data in characterizing potential contamination from these features.**

Response: Responses to all Site 12 comments can be found in Appendix R of the draft Site 12 OU RI report.

13. **Comment:** **Section 12.5.3, Groundwater Flow Patterns and Velocity, IR Site 12: The text describes groundwater flow at Site 12 as radial, whereas the flow pattern is really a component of radial flow for all of Treasure Island. Please correct.**

Response: Responses to all Site 12 comments can be found in Appendix R of the draft Site 12 OU RI report.

14. **Comment:** **Figures 12-5a, 12-5b, 12-7a, 12-7b: These figures should be revised so that the data are split geographically (e.g., east/west) and so that soil and groundwater maps can be overlaid to aid evaluation. If all data points are to be shown on all maps, then those data points for which data are presented on the companion map must be identified as such. If this is not done, then**

locations without data are taken to represent nondetect for all analytes (see General Comment #8). The figures as presented are counterproductive and do not aid evaluation of the data for which the Navy has expended considerable resources to obtain.

Response: Responses to all Site 12 comments can be found in Appendix R of the draft Site 12 OU RI report.

15. **Comment:** **Section 14.1, Site Description and Operational History (IR Site 21): The second and third paragraphs should be combined to describe the process of waste oil recovery at Site 21. The text as written does not accurately describe the process. Reordering the sentences would help improve the accuracy.**

Response: The second and third paragraphs have been revised to clarify the description of the waste oil handling procedures. The description of procedures was revised to follow the order of the procedures.

16. **Comment:** **Section 15.9.1, Evaluation of Adequacy of Data Collection (IR Site 24): The first paragraph states, "Groundwater analytical results indicate that the center of the solvent plume is located beneath Building 99." This sentence would be more relevant if it stated that the groundwater contours, based on analytical results, indicate that the <u>source</u> of the solvent plume is the east end of Building 99. Please revise as appropriate.**

Response: The text will be revised to read, "Based on the isoconcentration contouring of the groundwater analytical results, the source of the solvent plume is the east end of Building 99." It should be noted that the additional characterization data for Site 24 (Tetra Tech EM Inc. [TtEMI] 1998) further supports this inference. The additional characterization data will also be included in the final RI report.

17. **Comment:** **Figure 15-1, Site Location Map, IR Site 24: Please add the Site 24A/24B boundary to the legend.**

Response: The figure will be revised as requested.

18. **Comment:** **Section 15.9, Nature and Extent of Chemicals of Concern, IR Site 24: The Navy should consider using detailed sampling through profile sampling or multi-level sampling to further evaluate the vertical distribution of chlorinated hydrocarbon contamination in groundwater and evaluate remedial alternatives.**

Response: The additional characterization data for Site 24 (TtEMI 1998) sufficiently defines the spatial distribution of the solvent plume for a feasibility study. The additional characterization data will be included in the final RI report.

19. **Comment:** **Chapter 16, IR Site 28: Please include the map from the Blaine report. It is difficult to evaluate the existing information without knowing where the original samples were located. It is possible that most of those sample locations are now covered as a result of slope stabilization efforts.**

Response: The original samples were most likely collected in areas where stabilization activities have been conducted. Detailed information on the actual sample locations is not available. Samples were collected with the intent to protect workers applying the slope stabilization material, consequently the sample locations were not surveyed or carefully noted. This will be clarified in the text.

20. **Comment:** **Chapter 18, Conclusions and Recommendations: DTSC cannot concur on conclusions for sites 12, 24, 11, 28, and 29 until the proposed addenda are submitted.**

Response: Additional characterization data for Site 24 and ecological validation data for Sites 11, 28, and 29 will be incorporated into the final RI report, including Chapter 18, "Conclusions and Recommendations." Responses to all Site 12 comments can be found in Appendix R of the draft Site 12 OU RI report.

21. **Comment:** **Section 18.2, Recommendations and Conclusions:**

a. **Those sites recommended for no action under CERCLA and transfer to the Navy's UST Program (Sites 9 and 17) must continue to be monitored for CERCLA substances. This information should be evaluated by the Regional Water Quality Control Board. Any evidence of CERCLA releases must be forwarded to DTSC.**

Response: The interim groundwater monitoring plan for NAVSTA TI (PRC Environmental Management, Inc. [PRC] 1997) includes annual monitoring for TPH-extractable and metals at Site 9 and quarterly monitoring for TPH-extractable and volatile organic compounds at Site 17. The monitoring plan was reviewed by both DTSC and the Regional Water Quality Control Board, and the groundwater monitoring reports are submitted to both agencies.

b. **The Navy should clarify that Site 24A (dry cleaning facility) is subject to further Feasibility Study; Site 24B (5th Street fuel release) is recommended for transfer to the UST program.**

Response: The text will be revised as requested.

22. **Comment:** **Table 18-1, Recommendations for IR Sites:**

a. The last column ("Recommendations/Conclusions") does not really contain conclusions; that word should be deleted from the column heading.

Response: The table will be revised as requested.

b. Site 1: The table should include information about source control activities.

Response: The table will be revised as requested.

c. Site 5: This summary does not make it clear if fuel contamination in pit TP03 will be addressed under the UST program, even though the contamination is located some distance from the fuel line. The Navy should consider combining Sites 5, 17, and 24A.

Response: The Navy has evaluated these sites and is considering revision of their respective boundaries.

d. Site 7/10: Please separate risk calculations for Sites 7 and 10 to support the "No action under CERCLA" recommendation for Site 7.

Response: The carcinogenic risks and noncarcinogenic hazards for Site 7 and 10 will be estimated separately in the final RI report.

e. Site 12: Please include "Possible recommendation for FS following conclusion of additional investigation."

Response: Responses to all Site 12 comments can be found in Appendix R of the draft Site 12 OU RI report.

f. Site 24: The table should include dividing Site 24 into 24A and 24B (and rationale for doing so) in the recommendations.

Response: The table will be revised as requested.

23. **Comment:** **Appendix O: Response to Agency Comments on the Draft Remedial Investigation Report DTSC General Comment #3: The Navy's response states, "It was further agreed that the project managers would meet at another time to discuss an evaluation of the beneficial uses associated with groundwater at NAVSTA TI." Please provide an update on the planning for this meeting.**

Response: Beneficial uses of groundwater at NAVSTA TI were most recently discussed between the Navy and the regulatory agencies on June 1, 1999. Additional discussions are planned.

24. **Comment:** **DTSC Comment #5, Appendix G: The Navy's response states, ". . . EPA agreed to determine if a utility worker scenario was being evaluated at any other Naval installations." Please provide an update on this information.**

Response: Based on a request by the DTSC project manager, the Navy has agreed to evaluate potential construction worker exposure to chemicals detected in soils (0 feet below ground surface (bgs) to the maximum depth sampled) and groundwater in the human health risk assessment for Site 12. However, at a number of project team meetings held to discuss the methodology used in the human health risk assessment, the team decided that evaluation of the construction worker was not necessary for NAVSTA TI. This decision was based on the assumption that the frequency and duration of exposure for a construction worker would be significantly less than that of a resident and that a residential scenario would provide an upper-bound estimate of the potential risks to a construction worker. In addition, the agency toxicologist and project managers acknowledged that it is not appropriate to evaluate short-term (acute) exposures in a baseline human health risk assessment (BHHRA) because the methodology developed to evaluate a CERCLA BHHRA was established to evaluate long-term (chronic) rather than acute exposures. At a Base Realignment and Closure (BRAC) cleanup team (BCT) meeting held on April 4, 1997, the agencies confirmed that they had agreed very early in the project that evaluation of a construction scenario in the BHHRA was not necessary.

REFERENCES

PRC Environmental Management, Inc. (PRC). 1997. "Final Interim Groundwater Monitoring Plan, Naval Station Treasure Island." September 2.

Tetra Tech EM Inc. (TtEMI). 1998. "Final Site 24 Additional Characterization Summary Report, Naval Station Treasure Island." January 7.

TtEMI. 1999. "Draft Site 12 Operable Unit Remedial Investigation Report, Naval Station Treasure Island." June 1.

RESPONSE TO DTSC-HERD COMMENTS ON VOLUME 1 OF THE DRAFT FINAL ONSHORE REMEDIAL INVESTIGATION REPORT, NAVAL STATION TREASURE ISLAND SAN FRANCISCO, CALIFORNIA

This document presents the Navy's responses to comments from the Department of Toxic Substances Control's (DTSC) Human and Ecological Risk Division (HERD) on Volume 1 of the draft final onshore remedial investigation (RI) report for Naval Station Treasure Island (NAVSTA TI), dated September 1997. The comments are dated November 21, 1997.

GENERAL COMMENT

1. **Comment:** **Overall the Navy has provided a useful analysis of project activities at NAVSTA TI. Problems remain such as the avian species inventory which appears to be superficial and incomplete (point #5, below), but the general discussion of habitat and biological resources is generally comprehensive being based in the main on 1986-1987 evaluations: Natural Resources Management Plan, Treasure Island Naval Station and the Draft Environmental Impact Study for Battleship/Battlegroup/Cruiser Destroyer Group Homeporting, the latter prepared for the U.S.S. Missouri and her escort. Closure of NAVSTA TI and other Bay Area Navy installations occurred subsequent to local political opposition to homeporting the Battleship Missouri and her support services.**

   Since the drafting of these documents, the NAVSTA TI has formally been closed; the introductions to these texts should be updated to indicate same.

   Since many readers limit themselves to the Executive Summary of such volumes of data and their analyses, it is wise to spend a considerable level of effort on refining the presentation of the summary so as to ensure, insofar as is possible, that the very technical messages the authors wish to convey to the lay public are clear and understandable and demonstrate the considerable resources which have been devoted to the NAVSTA TI project. It would be helpful at the outset to indicate the disposition of the original 29 sites and for those eliminated here (e.g., 27) why such was the case (moved to offshore investigation phase of NAVSTA TI project?).

   Response: Where appropriate, the executive summary will be revised as recommended.

SPECIFIC COMMENTS

1. **Comment:** **Page ES-3. Please provide reference from the text proper (P. 2-10) to supporting documentation that substantiates the contention that fresh groundwater at NAVSTA TI does not meet the provisions of SWRCB Resolution 88-63.**

Response: The reference to supporting documentation is provided on page 2-10. The Navy does not believe it needs to be repeated in the executive summary.

2. **Comment:** **Page ES-3. Since it is possible that potential future commercial/industrial (p. 3-32: hotel theme park, conference center, resort, housing) and residential land use at NAVSTA TI will involve demolition and construction (e.g., installation and service of utility corridors, foundation renovation, seismic retrofit), why was no construction worker exposure scenario included in the present discussion of health risk?**

Response: Based on a request by the DTSC project manager, the Navy has agreed to evaluate potential construction worker exposure to chemicals detected in soils (0 feet below ground surface (bgs) to the maximum depth sampled) and groundwater in the human health risk assessment for Site 12. However, at a number of project team meetings held to discuss the methodology used in the human health risk assessment, the team decided that evaluation of the construction worker was not necessary for NAVSTA TI. This decision was based on the assumption that the frequency and duration of exposure for a construction worker would be significantly less than that of a resident and that a residential scenario would provide an upper-bound estimate of the potential risks to a construction worker. In addition, the agency toxicologist and project managers acknowledged that it is not appropriate to evaluate short-term (acute) exposures in a baseline human health risk assessment (BHHRA) because the methodology developed to evaluate a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) BHHRA was established to evaluate long-term (chronic) rather than acute exposures. At a Base Realignment and Closure (BRAC) cleanup team (BCT) meeting held on April 4, 1997, the agencies confirmed that they had agreed very early in the project that evaluation of a construction scenario in the BHHRA was not necessary.

If DTSC-HERD still believes the construction worker scenario should be included in the BHHRA, the issue should be raised at the next project team meeting for further discussion.

3. **Comment:** **Page ES-3. Under the construction and industrial land use exposure scenarios, why are no comparisons made to 8 CCR 1532.1 and 8 CCR 5155 PEL values?**

Response: It is not clear why DTSC-HERD suggested that the Navy compare site concentrations to Occupational Safety and Health Administration (OSHA) standards (8 CCR 1532.1 and 8 CCR 5155) when evaluating the construction scenario. It is the Navy's understanding that DTSC typically objects to the use of OSHA standards in CERCLA BHHRAs performed at military installations.

4. **Comment:** **Page ES-4. Under the City of San Francisco reuse plan (jail, resort, conference center, film studio, theme park, hotel family housing) - with commercial/industrial apparently the more widespread - it would be helpful to state whether the blood lead 10 ug/dL criterion at sites 11, 12, 28 and 29 is exceeded when the ingestion of homegrown produce is not considered a complete pathway?**

Response: The results of the blood lead modeling for Sites 11, 12, 28, and 29 were presented in detail in their individual sections of the RI report. The blood lead spreadsheets were provided in Appendix G. Ingestion of homegrown produce is considered for the resident only. For all other receptors evaluated, ingestion of food from sources other than homegrown produce is evaluated.

5. **Comment:** **Page ES-4. Ecological risk. In this section, it is worthwhile to re-emphasize at the outset of this section that Treasure Island is of artificial fill origin; thus, no native plants can by definition exist. However, the authors elected to exclude 'terrestrial receptors" from the TI assessment, but it can reasonably be expected that birds will visit the island. It is helpful to the reader to state here whether it has been unequivocably determined that endangered, threatened or otherwise special status animals live on or near TI, with particular reference being paid to marine mammals. What species (bird, rodent, canine, feline, etc.) among all possible Bay Area animals, were eliminated from consideration here and why? Among the federal statutes specifically cited as ARAR in CERCLA include the Marine Protection Research and Sanctuaries Act, and special attention in the present assessment is needed for those species; it is worthwhile to point out clearly that attention in the Executive Summary.**

Response:

1) The following sentence will be added as the first sentence, third paragraph, Page ES-4:

   "Treasure Island was constructed from artificial fill, therefore no native plants by definition exist on Treasure Island."

2) Risk to terrestrial receptors was not analyzed at Treasure Island (TI), but was analyzed on Yerba Buena Island (YBI). The habitat on TI is composed of large areas of pavement, gravel, buildings, and landscaped areas and is considered to be of low ecological relevance. These habitat types are not known to support species of ecological concern. Formal endangered species surveys were not conducted to confirm this assertion; however, a group of Navy and federal, state and regional agency representatives concluded during a site tour that the receptor species' use of TI was infrequent, the terrestrial receptor risk was minimal, and further assessment of the TI sites for the phase II ecological risk assessment ERA was not necessary (PRC Environmental Management, Inc. [PRC] 1994).

3) Small mammals and raptors were the feeding guilds considered in this report. It is acknowledged that birds will seasonally visit TI, however, no suitable habitat on the island exists to support species of ecological concern. This report is focused on the onshore receptors of TI, and does not include analysis of the shoreline and offshore areas that are habitat for other species of concern including migrating waterfowl and marine mammals. These areas are discussed in the offshore sediments RI report (Tetra Tech EM Inc. [TtEMI] 1999).

4) Although applicable or relevant and appropriate regulations (ARAR) are not identified in the executive summary, Chapter 4 of the report includes a discussion of ARARs.

6. **Comment:** **Page ES-4. It is worthwhile to add a sentence to explain how the "selected terrestrial receptors of YBI concern (deer mouse, falcon, kestrel)" were selected to either represent or to the exclusion of other possible/potential animals that may inhabit or visit YBI.**

Response: On Page ES-4, the second sentence of the fourth paragraph will be amended to read:

> These receptors, including the deer mouse (*Peromyscus maniculatus*) and American kestrel (*Falco sparverius*), were selected to represent larger guilds of animals with similar natural history characteristics (small mammals and raptors) that occur or may occur at Yerba Buena Island. In addition, the peregrine falcon (*Falco peregrinus anatum*) was selected as a receptor because of its special status designation by state and federal agencies.

Nests of the peregrine falcon are known to exist on the San Francisco Oakland Bay Bridge, including one on the support structure east of YBI and one on the central support structure of the bridge between YBI and San Francisco.

7. **Comment:** **Page ES-4. What does the statement, "Collection of tissue samples preyed upon by the peregrine falcon is recommended to assess the falcon's exposure to contaminants from these sites," mean? Do the authors propose the Navy capture, kill, and analyze adipose and other tissue from pigeons? red wing blackbirds? How would one know whether the bird(s) selected for analysis had not received their exposure from sources other than NAVSTA TI? It would help to explain in brief what is actually proposed here in somewhat greater detail since oftentimes readers limit their impressions to what is presented in the summary of such large documents, especially since there are five such documents in the present case.**

Response: The food-web model indicated potential impacts to individual raptors, such as the peregrine falcon, when conservative assumptions were employed. Because peregrine falcons are an endangered species, effects on individuals may impact the overall population, and additional information was warranted to better quantify the risk. Therefore the Navy, in consultation with the regulatory agencies, initiated a study to validate the modeling results for the peregrine falcon. The final validation study work plan was dated November 1998 (TtEMI 1998a).

In accordance with the work plan, bird surveys were conducted on YBI in April 1998 to help determine whether resident birds typically preyed upon by peregrine falcons commonly occur at Sites 11, 28, and 29. The rationale was that if common prey species occur at these sites and ingest contaminants, these birds may represent a complete exposure pathway to the peregrine falcon. Based on the survey results, collection of tissue samples from suitable resident prey species was recommended to quantify potential ecological risks to the peregrine falcon from chemicals of potential ecological concern (COPEC) at Sites 11, 28, and 29. On the advice of Mr. Brian Walton of the Santa Cruz Predatory Bird Research Group (SCPBRG), the work plan identified the following species as common prey species that might be suitable for collection of tissue residue analysis: American robin (*Turdus migratorius*), European starling (*Sturnus vulgaris*), killdeer (*Charadrius vociferus*), barn swallow (*Hirundo rustica*), and Brewer's blackbird (*Euphagus cyanocephalus*). After a review of the survey results by Mr. Walton, the list was expanded to include the white-crowned sparrow (*Zonotrichia leucophrys*), red-winged blackbird (*Agelaius phoeniceus*), and house finch (*Carpodacus mexicanus*). The results of the bird surveys are presented in a technical memorandum dated October 9, 1998 (TtEMI 1998b).

During March 1999, tissues of peregrine prey species were collected from Sites 11, 28, and 29 by an expert sharpshooter from SCPBRG. Tissues were analyzed for the appropriate COPECs using methods consistent with the quality assurance project plan (PRC 1997). In general, daily doses to the peregrine falcon, based on the collected tissue data, will be compared to toxicity reference values (TRV) using the hazard quotient (HQ) approach to estimate potential risk. For each COPEC at Sites 11, 28, and 29, a high and low TRV and a high and low dose will be evaluated. Hazard quotients will be calculated (HQ = dose/TRV) to evaluate potential risk to peregrines and to validate the literature-derived dose models used in the RI.

8. **Comment:** **Page ES-4. Please explain in the Executive Summary why no similar studies of benthic organisms, many of them sedentary by nature, or near-shore aquatic food sources are proposed here to determine potential food chain bioaccumulation for wading/foraging birds, carnivorous fish and the like? If other studies or programs address these endpoints, please point that out for the reader.**

Response: The following paragraph will be added to Page ES-4.

"The potential ecological effects to aquatic receptors from Treasure Island and Yerba Buena Island operations is presented in an Offshore Sediments RI, dated March 19, 1999 (TtEMI 1999)."

9. **Comment:** **Page ES-4. Describe what is meant by "total Petroleum hydrocarbons": Bunker C? Marine diesel? Waste crankcase oil? Hydraulic oils? Please give brief mention of the name or regulatory agency approved 'groundwater model' used here.**

Response: Laboratory chromatograms were reviewed to determine the classification of petroleum hydrocarbons present in project samples. Fuel fingerprinting analysis was performed on selected samples from several TI sites. Due to the influence of weathering and/or dissolution into groundwater, distinct identification of fuel products was not viable. The more general designations of "gasoline range," "diesel range," and "motor oil range" were employed to distinguish between categories of petroleum hydrocarbons. These designations are made based on the predominance of peaks within given carbon ranges. If the majority of the peaks fall between C6 and C10 they are reported as gasoline range, C10 through C23 as diesel range, and greater than C23 as motor oil range. If a given sample chromatogram encompasses more than one fuel range, those ranges are reported separately.

Historical records describing the types of fuels used at TI were reviewed. Gasoline, diesel fuel no. 2, Bunker C, and hydraulic oil were used most often at TI and are likely sources of petroleum contamination, but the records are not detailed enough to determine where contamination from each fuel may have occurred.

The groundwater model used was the Analytical Transient 1-, 2-, and 3-Dimensional (AT123D) model, which is accepted by the U.S. Environmental Protection Agency (EPA). The AT123D model was used to simulate contaminant fate and transport in the saturated zone. This model was chosen because it has been used extensively for similar applications, is in the public domain, is well documented, and is accepted by scientific and regulatory communities (Yeh 1981, EPA 1985, Odencrantz and others 1992, General Sciences Corporation 1995). According to a comprehensive summary of available models assembled for EPA by the International Groundwater Modeling Center, the AT123D model has been field tested, and the theoretical basis for the model has been peer reviewed (EPA 1993).

10. **Comment:** **Page ES-5. Please describe - in brief - how the "ecotoxicological testing" was carried out. If the chronic "threshold values" were determined only by acute toxicity testing of effluent or extract, the threshold values may not accommodate or address ecologic damage due to food web bioaccumulation into fish, birds or marine mammals.**

Response: Acute toxicity was used as part of the ecotoxicological testing to evaluate the site-specific toxicity of total petroleum hydrocarbons (TPH) to aquatic receptors. Once the acute toxic effects of TPH were determined, several correction factors were applied to the toxicity numbers to develop the threshold values. The correction factors included a factor of 2.0 to account for the additional toxic effects that might occur during chronic exposure. A description of the ecotoxicological testing is not appropriate for the executive summary. A complete discussion of the ecotoxicological testing is presented in Appendix N of the RI report.

11. **Comment:** **Page ES-5. Please summarize - in brief - how the "ambient metals concentrations" for TI and the "background metals concentrations" for YBI were obtained, measured and calculated.**

Response: The calculation of ambient and background concentrations is briefly summarized in Section 3.6 and presented in detail in Appendix F of the RI report. The methodology does not need to be repeated in the executive summary.

12. **Comment:** **Page ES-5. The California SWRCB published various water quality criteria for enclosed bays and estuaries (e.g., 93-5WQ, May, 1993), yet it appears that the U.S. EPA ambient water quality criteria (AWQC) for saltwater life (chronic) were selected in lieu of California values? Since the SWRCB values include limits for saltwater aquatic life on common petroleum hydrocarbons (e.g., benzene, phenol toluene), would it not be useful to include those comparisons here as well? Why were only 'total petroleum hydrocarbon concentrations in groundwater compared to the petroleum screening levels developed from [acute?] ecotoxicological testing," rather than comparing the concentrations listed in SWRCB 93-5WQ (or promulgated equivalent) for enclosed bays and estuaries?**

Response: The water quality objectives for protection of saltwater aquatic life provided in the "California Enclosed Bays and Estuaries Plan" (State Water Resources Control Board 1993) are equivalent to the ambient water quality criteria (AWQC) with the exception of lead, which is 5.6 micrograms per liter (μg/L). To identify ecological contaminants of concern at TI the Navy used a screening level of 5.6 μg/L in the contaminant fate and transport modeling (Appendix M of the RI report). The values for organic constituents (benzene, phenol, and toluene) provided in the "California Enclosed Bays and Estuaries Plan" are listed as objectives for the protection of human health and have no ecological basis.

Since AWQC have not been established for all constituents, the Navy went through considerable effort to develop petroleum screening criteria through ecological toxicity testing using fuels specifically from TI and sensitive ecological receptors selected by the California Regional Water Quality Control Board (RWQCB). The ecological toxicity testing approach at TI was developed by the Navy in cooperation with and using guidance from the RWQCB, DTSC,

and EPA. Using TPH screening levels developed specifically from weathered fuels present in the subsurface at TI accounts for the toxicity of constituents for which AWQC have not been established, the toxicity of TPH as a whole, and the synergistic effects of constituents present. This will be clarified in the text.

13. **Comment:** **Page ES-6. Some rationale should be provided to substantiate the recommendation that additional soil and groundwater data need to be gathered for the old bunker area. It appears from the text as written that project management would be more efficient had all necessary site characterization data been collected prior to drafting the baseline risk analysis?**

Response: Responses to all Site 12 comments can be found in Appendix R of the draft Site 12 OU RI report, dated June 1, 1999.

14. **Comment:** **Table ES- 1. Substantiation and explanation of footnote c for the PCB storage area, army point sludge disposal and the Bay Bridge on- and off-ramps should be added. For example, at the PCB storage area, it appears no detectable (?) PCBs were found in soil; should this be the case, then why would follow-on studies in this context be necessary?**

Response: Footnote c will be revised as requested.

15. **Comment:** **Table ES- 1. For all areas with groundwater metals established as constituents of concern (aquatic receptors) (e.g., beryllium, mercury, copper, zinc at the pesticide storage area/bus painting shop), how do the groundwater metals concentrations compare to the concentrations in brackish groundwater encountered normally elsewhere at Treasure Island? While the authors have made efforts to determine as best as possible to establish naturally-occurring ambient/background soil/rock metals concentrations, what efforts were made to determine background groundwater metals concentrations at YBI and at TI?**

Response: At present, no ambient or background concentrations for metals in groundwater at YBI and TI have been determined. The Navy collected filtered groundwater samples in 1998, and detected concentrations of dissolved metals in filtered groundwater were generally much lower than previously detected concentrations of suspended and dissolved metals in unfiltered groundwater. For example, at Site 10, where beryllium, mercury, copper, and zinc concentrations previously exceeded AWQC in unfiltered groundwater samples, these metals were not detected in filtered groundwater samples collected in 1998. Using the 1998 filtered groundwater data, it appears that only a limited number of metals exceed AWQC at a few Installation Restoration (IR) sites. In general, where metal concentrations in filtered samples exceed AWQC, probable sources exist at the site. Therefore, the development of ambient or background groundwater metals concentrations at YBI and TI did not appear to be warranted.

16. **Comment:** **Table ES- 1. Here and throughout the text, reference to "total petroleum hydrocarbons" is inadequate. The authors should specify whether the petroleum found is gasoline, diesel (automotive), marine diesel Bunker C, waste crankcase oil hydraulic oil or other fractions.**

Response: Please see the response to specific comment number 9.

17. **Comment:** **Table ES- 1. Provide a footnote to explain MCPP (not listed in pages ES- 13 footnotes?).**

Response: The footnote will be revised as requested.

18. **Comment:** **Table ES- 1, footnote e. DTSC guidance (Use of Soil Concentration Data in Exposure Assessments, July, 1992) indicates that health risk should be calculated to depth 10' below ground surface, yet the authors elected to use a depth of 2' bgs. What rationale or federal guidance can be listed in the footnotes to explain the discrepancy?**

Based on the City of San Francisco projected land use, this reviewer must point out that the author's assumption that no intrusive (e.g., construction excavation) activity will occur at TI. Given the City's use projections, it is possible that some or many of the existing Navy structures with deferred maintenance will be demolished and replaced entailing "significant soil mixing". With this uncertainty, this reviewer recommends that elimination of the construction worker exposure scenario and assumption that no future soil disturbance across the facility are not warranted from the text discussion as written.

Response: Footnote e of Table ES-1 indicates that a depth of 0 to 2 feet bgs was used for evaluation of Site 12. This depth interval was chosen because Site 12 is currently residential, and according to the reuse plan, the housing units will remain in place for future residents. Based on DTSC guidance, exposure to "all soils" (0 feet to the maximum depth sampled) will also be evaluated for all receptors. This assumes that subsurface soil can be mixed and brought to the surface during possible redevelopment activities including the removal of current structures, excavation of soil for construction of new facilities, and regrading.

Regarding the construction worker exposure scenario, please see response to specific comment number 2.

19. **Comment:** **Table 1-1, Pages 1-7, 1-8. For those areas removed from consideration (e.g., asbestos pipes, YBI fuel line breaks, broken storm water culverts), please provide footnotes to the table to explain why these areas were dropped.**

Response: The table will be revised as requested.

20. **Comment:** **Page 1-7. Citation to historic accounts and reports to support the contention that TI is "constructed (completely?) of materials dredged from the San Francisco Bay" is in order here. Given that imported fill from other areas of the Bay Area perhaps occurred, leading to potential difficulty in assignment of the ambient or reference metals values for soil/rock at TI it is necessary that all such statements be supported carefully.**

Response: Detail on the construction of TI is provided in Section 2.3, "Geology."

21. **Comment:** **Page 1-10, Section 1.3. It should be made clear in paragraphs 2 and 3 in this section whether DTSC and U.S. EPA oversight of NAVSTA conclusions in the PA/SI were approved, the date(s) of approvals and means by which (e.g., formal public hearings, consent agreement, remedial action order, letter to the site file, etc.) regulatory concurrence with elimination of sites 2, 8, 18 and 23 was achieved and documented. The reason(s) and rationale for additional work at sites 6 and 14 should be listed briefly along with reasons for supplemental study at sites 8 and 12.**

Response: The text regarding agency review and approval of the preliminary assessment and site inspection (PA/SI) will be clarified as requested. Rationale for additional investigations at individual sites is included in the site sections.

22. **Comment:** **Pages 1-10, 1-11. Since many of the problems at NAVSTA TI concern fuels and petroleum products, a reasonably detailed explanation of the UST and fuel line removal efforts should be given here. Rationale for not including those activities in the current documentation should be outlined in brief and the description of soil and groundwater cleanup activities and the agency responsible for oversight of those activities should be clarified. For example, why would a UST be located in the YBI landfill (site 11)? Can some brief description and rationale for 'closing in place' (as contrast to removal) for these UST be given?**

For those readers not completely familiar with CERCLA petroleum exclusion clause (p. 1-12) and DTSC Management Memorandum EO-94-015-MM, a brief summary is in order here (sites 4, 6, 14, 15, 19, 20, 22, 25).

Response: A description of the Navy's petroleum program and CERCLA petroleum exclusion clause will be added to the text. Specifics on underground storage tanks (UST) at particular IR sites are included in the IR site sections.

23. **Comment:** **Page 2-6. Cite report titles, biobliographic details to document the source(s) of artificial fill at NAVSTA TI (Section 2.3.2.2.1)?**

Response: The reference for this section will be added (Dames and Moore 1988). Other than the YBI landfill, the source of the artificial fill on YBI is not known. This will be clarified in the text.

24. **Comment:** **Page 2-7, Section 2.3.2.2.2. Is the Colma formation here the same or similar to that referenced in Presidio of San Francisco RI/FS (attachment)? Are the native concentrations of metals in Colma formation at YBI consistent with those for Colma lithology at the Presidio?**

Response: The native sands on YBI have been identified as several different units, including the Colma Formation (Blake and others 1974), colluvium derived from the Franciscan Assemblage (Radbruch 1957), and colluvium/dense eolian sands (Dames and Moore 1949, CalTrans undated). The samples used to determine background concentrations at YBI were characterized as a mixture of Franciscan-derived colluvium and marine sands (see Appendix F of the draft final RI report). The Colma Formation is a marine sand and does not contain colluvium (Shlocker 1974). Since the sand unit on YBI does not appear to be consistent with the Colma Formation at the Presidio, comparison of background metals concentrations between the different lithologies may not be appropriate.

25. **Comment:** **Page 2-7, Section 2.3.2.2.3. Do the Franciscan assemblage rock types referenced here correspond to those found at the Presidio? Do the metals concentration profiles for this formation resemble those found in Presidio background investigations?**

Response: The samples used to determine background concentrations at YBI were characterized as a mixture of Franciscan-derived colluvium and marine sands (see Appendix F of the draft final RI report). Since the Franciscan Assemblage does not typically contain a distinct unit of colluvium and marine sands (Shlocker 1974), comparison of background metals concentrations at YBI to the Franciscan Assemblage at the Presidio may not be appropriate.

26. **Comment:** **Pages 2-10, 2-11. Please provide a summary table in the text for the range of naturally-occurring metals in groundwater for both TI and YBI; failure to make such account has led to considerable confusion, delay, debate and controversy at the Presidio of San Francisco (R. Fuentes, DTSC Project Manager, Presidio of San Francisco).**

Response: At present, ambient or background concentrations for metals in groundwater at TI and YBI have not been determined. Should risk managers require the remediation of metals in groundwater where there are no apparent sources for these metals, the Navy may develop ambient concentrations for metals in groundwater at TI and YBI. It should also be noted that the Navy is currently collecting both filtered and unfiltered groundwater samples for metals analysis at TI.

27. **Comment:** **Pages 2-12, 2-13. Are data published or are reports available which assign relative source contribution (POTW, refineries, storm water runoff, surface street drainage, ship discharge, etc.) to the various sources of pollution in the Bay? Such reference would serve to support the general statements made in Section 2.6.1**

Response: The Navy will research to locate a reference.

28. **Comment:** **Pages 2-13 and 2-14. Please describe the sanitary sewer system and treatment outfall at YBI and TI in relation to the storm sewer system.**

Response: A description of the sanitary sewer system and treatment outfalls in relation to the storm sewer system will be added.

29. **Comment:** **Page 2-14. It would assist the reader a great deal if the authors were to provide details of plans, if any, by either the Navy or the City of San Francisco to repair, replace or otherwise upgrade the obviously poor existing collapsed/cracked/broken storm water drainage system, its outfalls and 5 pump stations.**

Response: To the extent practicable, any documented recent repairs and available plans for future repair of the storm water sewer system will be included in Section 2.7.2.

30. **Comment:** **Page 2-15, Figure 2-18. Given the aggressive efforts of the State of California to eradicate eucalyptus on nearby Angel Island State Park, please describe plans, if any, for similar restoration efforts at YBI. Such eradication of non-native plants would be expected to alter considerably the existing ecology and biological makeup/diversity of YBI.**

Response: No eucalyptus eradication efforts are planned for YBI.

31. **Comment:** **Page 2-16. Figure 2-18, Table 5. Along the shoreline of YBI do not beaches of some type exist? If so, would not these be areas where visitors might engage in beach activities or where wading birds (e.g., snowy egret, sandpiper, sanderling, Great Blue Heron) might forage? Is it not important to include the food sources for these animals in the assessment to document whether NAVSTA TI runoff or outfall may have contributed to chlorinated hydrocarbon or mercury (or other constituent of concern) accumulation in these animals?**

Specifically, what data are available to determine the contribution of fuels, metals, chlorinated materials and other chemicals at NAVSTA TI to anthropogenic degradation of the environmental quality of the San Francisco Bay?

As Table 2-5 is written, it is not clear how the column "Status" was verified (footnote a); are these animals present at NAVSTA TI or not? If not, and as they are common in the Bay Area, why not? While a brief inventory or overview may not have established the presence of *Ardea herodias* or other shore birds at a particular location or date, these are common animals even along freeways of the Peninsula and East Bay where standing water accumulates. Would not such birds be reasonably anticipated to inhabit YBI or other shores of NAVSTA TI in that these animals are so common in the Bay Area intertidal/marsh zones?

Response:

1) An investigation of ecological risks associated with shoreline areas and storm water outfalls is included in the offshore sediments RI report, dated March 19, 1999 (TtEMI 1999). This report includes an assessment of risk to shorebirds and piscivorous birds (such as the Willet and the Double Crested Cormorant) based on ingestion of site-collected prey tissue.

2) Numerous stormwater outfalls (Site 13) from NAVSTA TI discharge into the bay, carrying water, suspended sediment, and chemical residues. A stormwater pollution prevention project was conducted from 1992 to 1993 to investigate drainage areas served by each stormwater outfall. The investigation evaluated both stormwater and sediment to determine whether chemicals may have been discharged to the bay in the stormwater sewer system effluent (PRC 1993). Results from this investigation were incorporated into the offshore sediment RI report (TtEMI 1999).

3) The status of bird species listed on Table 2-5 of the report was determined based on the California Department of Fish and Game's Natural Diversity Database (CNDDB 1997). Because no formal bird surveys were conducted to determine the presence or absence of birds, Table 2-5 presents the potentially occurring species. It was compiled upon review of the literature, including a breeding bird survey conducted on TI and YBI (Bailey 1992), and the Audubon Society winter bird counts from 1990 and 1991 (Feinstein 1992). It is acknowledged that *Ardea herodias* and other shoreline species are likely to occur at the shoreline areas of TI and YBI; that is why *Ardea herodias* and other species are included in the table. However, shoreline species are not the focus of this report. This report focuses on terrestrial receptors. Receptors that forage in shoreline and offshore areas are addressed in the offshore sediments RI report (TtEMI 1999).

32. **Comment:** **Pages 3-4, 3-5. For the reader unfamiliar with magnetometry and ground penetrating radar, or the rationale for their use, please add a brief description why these techniques were employed at sites 11, 5 and 24 (Section 3.2.2) (e.g., suspected fuel lines, buried metallic debris, UST).**

Response: The rationale for conducting geophysical investigations is included in Section 3.2.2. The specific rationale for using geophysical surveys at specific sites is included in the section for each site. No changes to the text are proposed.

33. **Comment:** **Page 3-21. Section 3.5.3.2. Navy operations commonly use marine diesel and Bunker C, whereas NAVSTA TI results are given as 'TPH-diesel' (usually restricted to automotive diesel No. 2) and 'TPH-m' (motor oil). At the paint shop and other areas, mineral spirits, Stoddard solvent and related products would be in likely common use. Are the marine diesel gasoline (unleaded? Leaded?), Bunker C, kerosene, heating oils, Bunker C and other heavy oils properly characterized (D.A. Zemo et al The application of petroleum hydrocarbon fingerprint characterization in site investigation and remediation, Ground Water Monitoring Report Spring 1995, pp. 147-156)?**

Response: Comment noted. The Navy will seek further discussion with DTSC for resolution of this comment prior to submittal of the final RI report.

34. **Comment:** **Describe, please, the risk analysis implication of the statement: "It was common that the characterization of the petroleum product does not match the fuel type quantitated by the laboratory".**

Response: Analytical results for TPH were not evaluated in the human health risk assessment because there currently are no accepted toxicity values for petroleum mixtures. Instead, as discussed on page 3-39 of the RI report, the California Environmental Protection Agency (Cal/EPA) constituent-based approach for evaluating the toxicity of petroleum hydrocarbon mixtures was used in the BHHRA. Applying this approach, the most toxic constituents of petroleum hydrocarbons (benzene, toluene, ethylbenzene, xylenes, and polyaromatic hydrocarbons) are evaluated and considered to represent the toxicity of the hydrocarbon mixtures.

The methodology used to evaluate the toxicity of petroleum hydrocarbons was discussed at the risk assessors' meeting held on September 14, 1995. It was agreed that petroleum hydrocarbons would be evaluated using a constituent-based approach. This approach was presented and agreed upon at the Remedial Project Managers (RPM) and BCT (RPM/BCT) meeting on November 6, 1995, and was subsequently used in the draft RI report.

A meeting was held on April 4, 1997, to clarify agency comments received by the Navy on the draft RI report. At this meeting, it was agreed that the constituent-based approach used in the draft RI report was appropriate.

It is the Navy's understanding that, based on the numerous meetings held prior to and after submittal of the draft RI report, consensus had been reached on the methodology used to evaluate toxicity from petroleum products. In addition, no Cal/EPA- or EPA-approved toxicity values exist for petroleum hydrocarbon mixtures. For these reasons, the constituent-based approach used in both the draft and draft final versions of the RI report will also be used in the final RI report.

35. **Comment:** **Page 3-23, Section 3.6. Please compare/contrast the "ambient" and "background" values for the 19 metals to the off-site reference background for the immediate Bay Area (attachments), rather than to U. S. Continental or values for California from lithologies which may have no relation to those found locally.**

Please compare the mean and range of the 21 and 200 samples (using detected empirical verified values as contrast to including the 1/2 LOD theoretical estimates in the calculations) for YBI and TI respectively, to the mean and range for the two attached Bay Area background references; please comment on the variations and similarities in lithology between these locations.

Please explain why, in contrast to TI where 200 background locations were assessed, only 21 background locations were studied at YBI and why - in

brief with reference to the applicable appendices -those particular locations were selected as representative of ambient and background values; in short, why were those locations considered pristine or uncontaminated?

Response: As part of the RI conducted at NAVSTA TI, ambient and background levels of metals in soil at TI and YBI were established. The methodology for determining ambient and background levels for metals was developed by the Navy in close consultation with representatives from EPA, DTSC, and RWQCB.

In March of 1994, the Navy prepared a draft proposed approach for establishing ambient levels in soils at NAVSTA TI. Using that document as a basis for discussion, the agencies met to refine the approach. In August 1994, the Navy prepared a revised draft approach to establish ambient levels to address the comments raised at those meetings.

The approach used to define ambient levels was further refined at numerous meetings prior to preparation of the RI report. At the risk assessors' meeting held on September 14, 1995, the approach was reviewed and was found to be appropriate for use in the BHHRA. The issue was also discussed at the RPM/BCT meetings held on November 6 and December 13, 1995, and on July 2 and July 10, 1996. At these meetings, no new issues were raised that would require major revision of the technical approach. Based on the meetings, it was the Navy's understanding that DTSC and EPA had concurred with the Navy on the approach, and the draft RI report was prepared accordingly.

After the draft RI report was submitted on October 22, 1996, the Navy received comments from DTSC on January 22, 1997, and from EPA on January 15, 1997. The comments from DTSC and EPA were limited to general comments on the draft document and were addressed during a meeting held April 4, 1997. The approach used in the draft final RI report is explained briefly in Section 3.6 and in detail in Appendix F.

It is the Navy's understanding that the approach used to determine ambient and background values of metals in soil at TI and YBI had been agreed upon by DTSC, EPA, and the project team during multiple project meetings. Consequently, the Navy does not intend to revise the approach for the final RI report. Unless clear evidence can be provided that disputes the validity of the technical approach, the ambient and background methodology will not be revised for the final RI report.

36. **Comment:** **Page 3-23. What statistical analyses, if any, were utilized to determine "outliers"? It is not clear why data were eliminated, provided appropriate quality assurance/quality control was achieved, given that so few YBI background locations were collected and that numerous different geologic features/formations (with likely differing metals concentration profiles) occur at YBI (Fig. 2-5)?**

What is "current practice in the environmental industry"? It is much preferred that the authors reference standard statistical texts, standard

computerized programs/services and U.S. EPA documents (with accession numbers) to clarify the methods used and to verify their correct applications.

Response: Please see response to specific comment number 35. The technical approach used in determining ambient and background metals concentrations was developed by the Navy in conjunction with DTSC and EPA and is described in detail in Appendix F.

37. **Comment:** **Tables 3-3, 3-4. Please replace the PRG column with the mean and background range for LBNL and the Presidio background values. A short discussion of how NAVSTA TI metals concentrations -compare to those for these nearby, robust quality data sets (by lithology) is in order here.**

The text would benefit by expanding the discussion of location-specific geology to more clearly explain in brief the background determinations; e.g., "Although site 11 is located at YBI, site metals concentrations were compared to the TI ambient concentrations since the geology at site 11 is similar to the artificial fill at TI"?

Response: Please see responses to specific comment numbers 35 and 40.

38. **Comment:** **Page 3-28. Please discuss the protocol "Estimated values ('J' qualified) were included in the data set..." How were these values estimated? What EPA guidance was followed or used to do so? Please cite U. S. EPA or DTSC guidance and methods for calculation of 'J' qualified data. In discussions of the results of calculations using such 'J' data, how do the results and conclusions compare and contrast with similar results when estimated values are not included?**

Response: The data validation process is described in detail in Appendix E of the RI report.

39. **Comment:** **Table 3-5. The major problem with this table is inclusion of the range of U.S. and unrelated California soil/rock (including data for mines and salt flats) which are not necessarily informative about local conditions or applicable to NAVSTA TI. While presentation of U.S. and California soil/rock metals values are an adjunct to the local geologic measurements, these ranges may have little or no bearing on site decision-making at NAVSTA TI. First, are the range of values for any metal or element (calcium, iron, magnesium, potassium, sodium) at NAVSTA TI consistent with empirical background in any of the areas of concern at NAVSTA TI? Second, were the concentrations of these elements increased in any of these study areas due to Navy operations or release? Third, are the soil concentrations in the areas of concern consistent with empirical background (YBI) or ambient (TI) and are those concentrations consistent with local published Bay Area background values for these elements?**

Response: The approach used in the RI is consistent with EPA and DTSC guidance, which indicate that these elements can be deleted from the BHHRA because of their low toxicities at environmental concentrations.

40. **Comment:** **Page 3-30. A paragraph discussion of the "similar geology" at YBI Site 11 to the whole of TI is in order here.**

Response: The similarity in geology is detailed in Appendix F, "Development of Ambient and Background Metals Concentrations in Soil," but will be reported in this section as requested.

41. **Comment:** **Page 3-31. Describe in detail and provide complete bibliographic source citation to explain point #4 "regional information" which was used to eliminate metals from the BHHRA. Provide reference to memorandum of understanding and date(s) to verify the regulatory and responsible party agreement for the 10% screening level.**

Response: The 10 percent ambient screening criterion (10 percent rule) was established by the Navy in consultation with EPA and DTSC. The criterion was selected based on a comprehensive review of site data and the spatial distribution of the data, and an understanding of historical operations at the site. The 10 percent rule was initially agreed upon at meetings that took place on July 2 and 10, 1996. In a meeting on April 4, 1997, EPA confirmed that it considers the 10 percent rule protective of human health and that the rule would not eliminate metals that should be retained in the human health risk assessment.

42. **Comment:** **Page 3-32. DTSC guidance (OSA, Use of Soil Concentration Data in Exposure Assessments, July, 1992) specifies residential risk assessment to be carried out to include depths of 10' bgs. Since depth to brackish and fresh water at TI is varied (Fig. 2-8), it may be that the DTSC default guidance cannot be applied directly at 11; however, such rationale would not necessarily apply at YBI (Figs. 2-5, 2-17, Section 2.5.2). Therefore, the depth to 10' should be used at YBI and the maximum depth sampled to no greater than depth to groundwater should be used at TI? The text is confusing on this matter.**

Response: As described on pages 3-32 and 3-33 of the draft final RI report, residential exposure to chemicals of potential concern in "all soils" (0 feet to the maximum depth sampled) at NAVSTA TI was evaluated because samples were not collected at depths greater than 10 feet.

Of the four IR sites at YBI, site 16 is not evaluated in the RI report, and the maximum depth sampled at sites 28 and 29 was 1.5 feet bgs. For site 8, exposure to soils from 0 feet to the maximum depth sampled (10 feet bgs) was evaluated, consistent with DTSC guidance.

43. **Comment:** **Page 3-34. Regardless of PRG comparisons, the flux chamber data and estimated VOC concentrations should be compared with BAAQMD ambient air ("background") concentrations for these materials. A statement as to whether site ambient air VOC concentrations are greater than, less than or about the same as other Bay Area locations for common VOC such as dry cleaning solvents should be added.**

Response: Comment noted.

44. **Comment:** **Page 3-5. As with all sport and commercial fish, there is both benefit and risk to dietary seafood. The authors overstate by a wide margin in their conclusion, "It is well documented that ingesting fish caught in San Francisco Bay can result in adverse health effects" and "The principal adverse health effects associated with chronic exposure to high levels in fish of these six chemicals of concern include cancer, developmental delays or brain damage in children, and kidney damage". Do the authors really believe that eating fish from the Bay (either sport or commercial) causes brain damage?**

While the page 3-36 section is technically accurate, it would be complete to replace these conclusions on page 3-35 with a brief outline of the ongoing off-shore sediment studies conducted by the NAVSTA TI cleanup team and by introducing the concept of dose (exposure). For example, those sediment studies will determine whether PCBs, mercury, chlordane, DDT, dieldrin and dioxins (p. 3-35) - that are ubiquitous environmental contaminants - were used, generated or otherwise originated at NAVSTA TI and if so, whether their use contributed to, leached or were discharged directly to the waters and sediments of the Bay. Do the authors plan to compare NAVSTA TI benthic species tissue concentrations to concentrations in those same species elsewhere in the Bay. Are the local concentrations to be compared for these six chemicals (why six?) to the Mussel Watch program results or plan to simply measure near-shore outfall sediments? Greater detail here would improve the presentation considerably.

Finally it is far from clear why commercial fish were excluded in the OEHHA advisory as in contrast to sport fish only. Are not both commercial and sport fish, often identical species, both subject to the same potential biocentration of the same six chemicals?

Response: At the risk assessors' meeting held on September 14, 1995, it was agreed that there is no quantitative way to determine the extent to which operations at TI have contributed to contaminant levels in fish in San Francisco Bay. It was further determined that in lieu of this information, Cal/EPA studies of health effects from ingestion of fish caught in San Francisco Bay would be summarized in the BHHRA. This decision was reiterated at the RPM/BCT meeting on November 6, 1995, and at the BHHRA meeting on April 4, 1997. Consistent with the decisions made at those meetings, the health advisories on fish consumption published by Cal/EPA are summarized in the RI report.

45. **Comment:** **Page 3-39. The failure of Cal/EPA and U.S. EPA to publish SF or RfD for dalapon makes due diligence of the responsible party to carry out their task most difficult. As an approximation, it is recommended that the authors derive a RfD for dalapon from its acute toxicity database (available summarized in RTECS) and using the method of Layton et al (Deriving**

allowable daily intakes for systemic toxicants lacking chronic toxicity data. *Regulatory Toxicology and Pharmacology* 7: 96-112, 1987) and that dalapon then be carried through the present assessment in the usual manner.

Response: At the risk assessors' meeting held on September 14, 1995, it was agreed that only Cal/EPA- and EPA-approved toxicity values would be used in the BHHRA. At this meeting and at the RPM/BCT meeting held on November 6, 1995, it was agreed that the cost involved in developing toxicity values for compounds for which no approved values exist might not be justified. This approach was used in the draft and draft final RI report, and it is the Navy's understanding that agency consensus had been reached on this issue.

46. **Comment:** **Page 3-39. Why weren't petroleum hydrocarbon toxicities evaluated using published toxicology data summaries for diesel (e.g., Millner et al. Human health-based soil cleanup guidelines for diesel fuel No. 2. *Journal of Soil Contamination* 1(2): 103-157, 1992), gasoline (ATSDR, Toxicological Profile for Automotive Gasoline, June, 1995), and Bunker C (e.g., Soil Cleanup Levels for High Boiling Point Petroleum Hydrocarbons, EMCON, August 1995) for the whole product? Since weathered/degraded materials contain little BTEX and PAH are virtually absent from gasoline and mineral spirit/solvent cut petroleum fractions, how was the toxicity of the remaining materials handled? Was ethyl benzene handled as a carcinogen (U.S. National Toxicology Program PB93-149722; clear evidence male rat, some evidence female rat, both sexes mice/ NTP Management Status Report July 9, 1997) or as the previous IRIS non-carcinogen?**

Response: Please see response to specific comment number 45.

47. **Comment:** **Page 3-8. This section and the first sentence here are in direct conflict with the last sentence on page 2-15 ("Because of these factors, TI was not considered for ecological risk assessment for terrestrial receptors.")**

Response: No changes are recommended to the current text. The sentence, "The following sections describe the approach and methodology used at NAVSTA TI to assess the ecological risk to terrestrial receptors," is accurate. NAVSTA TI includes Navy property on both TI and YBI. No assessment of risk to terrestrial receptors was conducted for Treasure Island (as explained on page 3-44 and Section 2.8), but an assessment of risk to terrestrial receptors on YBI was conducted and is summarized in Section 3.8.

48. **Comment:** **Page 3-46. Since only two days of bird surveys, taken only one week apart (June 15 and 22, 1994), were taken, how can this be considered even preliminary? Migratory birds are seasonal and would be expected to change in composition and numbers throughout the year, or from year-to-year. This appears to be a fundamental omission in the NAVSTA TI site characterization.**

Response: It was not expected that bird surveys conducted in the summer season would account for seasonally migrating birds. For this reason, Table 2-5 was compiled based on a literature review to include potentially occurring species that are year-round or seasonal, including a breeding bird survey conducted on TI and YBI (Bailey 1992) and the Audubon Society winter bird counts from 1990 and 1991 (Feinstein 1992). Also note that the protocol for the bird surveys was reviewed by the regulatory agencies.

49. **Comment:** **Page 4-5. The Navy has failed to identify 40 CFR 761 *(Federal Register* 59: 62788) as potential PCB ARAR or to cite NOAA [HAZMAT Report No. 94-8] Administrative Screening Guidelines and U.S. EPA OSWER Directive No. 93555.4-01 FS (August, 1990) PCB soil cleanup levels.**

The Navy has failed to identify the Water Code, Division 7, Chapter 1, Section 13000 as either action-specific ARAR or TBC criteria.

Response: The Navy will evaluate the cited regulations to determine if they are potential ARARs or to-be-considered (TBC) for NAVSTA TI.

50. **Comment:** **Pages 5-2, 5-3. Cite the Kodak MSDS in the bibliography. Please clarify the discussion of wind and surface water transport of silver from the X-ray developer; is not this area overlain by Building 257, effectively reducing substantially (perhaps to negligible amounts or levels) any such hypothetical transport?**

Response: The Kodak material safety data sheet (MSDS) will be included in the reference section, and the Section 5.2, conceptual model, will be revised to further interpret the low potential for transport by wind and water since the affected area is beneath a building.

51. **Comment:** **Page 5-4. Groundwater metals and ambient water quality criteria: just as mean ambient soil As concentrations at NAVSTA TI are greater than the U.S. EPA Region IX PRG values, so are groundwater zinc and nickel concentrations greater than AWQC. Please add a section to 2.5.1.4 and 2.5.2 to establish ambient/background pH and metals concentrations in NAVSTA TI groundwater.**

Response: At the risk assessors' meeting held September 14, 1995, it was agreed that there is no complete exposure pathway for direct human contact with groundwater at TI. Volatile organic compounds (VOC) in groundwater are addressed in the inhalation pathway, and VOCs are the only compounds of concern in groundwater. Consequently, it is not necessary to provide detailed information in Section 2 regarding ambient or background pH and metals concentrations in TI groundwater.

52. **Comment:** **Page 5-6. Please indicate whether remaining silver concentrations at Bldg. 257 are greater than, less than or about the same as the applicable U.S. EPA soil PRG for projected land use (e.g., Table 3-3).**

Response: Confirmation sampling locations and corresponding silver concentrations are shown on Figure 5-3. As can be seen in the figure, no samples exceed the residential preliminary remediation goal (PRG) of 380 milligrams per kilogram.

53. **Comment:** **Pages 6-1, 6-2. Please compare "wipe sampling PCB results to ARAR for surfaces (Toxic Substances Control Act 40 CFR 76 1, <10 ug/100 cm non-porous surface, should such be relevant in this situation.**

Response: As shown in Table 6-2, the polychlorinated biphenyl (PCB) concentrations in the two wipe samples collected at Site 03 were 2.6 and 3.5 micrograms per 100 square centimeters, both below 10 micrograms per 100 square centimeters.

Also please see response to specific comment number 49.

54. **Comment:** **Page 6-4. The DTSC project manager is notified to inquire whether two soil/asphalt sampling locations are adequate to characterize a 100 square foot PCB transformer storage area, how those two locations were selected and where various spills had been documented in the past.**

Response: Comment noted.

55. **Comment:** **Page 7-2. The bottom paragraph conclusion concerning migration of fuel components to the Bay will depend on the nature of those products; while the heavy oils move little unless dissolved or disturbed the light fractions of diesel gasoline, kerosene or mineral spirits can migrate readily. The authors should clarify the fuel or petroleum product type(s) in pipelines, soil and groundwater referenced here.**

Response: Please see response to specific comment number 2.

56. **Comment:** **Page 7-9. The authors compared the weathered diesel at Site 5 to a "TPH screening level of 430 ppm". It is far from clear how this generic 'screening level' was derived or the toxicologic or other endpoint upon which or the chemical(s) upon which it was determined (ecologic, leaching potential, carcinogenesis?). While TPH values of 7,200-26,000 may appear 'high' in relation to a 430 ppm generic or default value, site-specific human health risk assessments show that in the absence of overt PAH contamination, heavy oil fractions in that range are consistent with commercial land use exposure scenarios, in the absence of substantive off-site migration (Soil Cleanup Levels for High-Boiling-Point Petroleum Hydrocarbons, Emeryville, California. EMCON, August, 1995).**

Unequivocal identification of heavy oil (Bunker C) or fresh or used crankcase or hydraulic oils is essential here. Clear identification of the materials of concern, not use of acronyms or generic or vague terms, will increase reader understanding of NAVSTA TI considerably.

Response: The text will be revised to refer to Appendix N, which details the development of ecological TPH screening levels. The TPH screening levels referenced by DTSC are based solely on risk to human health.

57. **Comment:** **Pages 7-9, 7-10. Since the petroleum constituents are co-mingled with chlorinated solvents and inorganic Hg, it is this reviewer's understanding that the CERCLA petroleum exclusion {cited on p. 1-12} would not apply here (DTSC Management Memorandum Eo-94-015-MM December 5, 1994). For DTSC project management, it is important to establish that sites 4, 6, 14, 15, 16, 19, 20, 22 and 25 present no other chemicals (e.g., PAH, metals) that prevent application of petroleum exclusion at those, locations.**

Response: The CERCLA petroleum exclusion is not the reason that no further action is proposed at Site 05. Rather, constituents regulated under CERCLA at Site 05 (chlorinated hydrocarbons, mercury, lead, beryllium) do not present a risk to human health or the environment and therefore are not recommended for further action under CERCLA.

58. **Comment:** **Section 7.7.2.2. Given that no deed restriction or other controls to prevent excavation as in theme park construction at site 5, construction activities could result in dermal contact with and volatilization of chemicals from groundwater in trenches/foundation borings and pits. To complete the construction exposure scenario, those pathways should be added to the Soil contact ingestion/percutaneous absorption scenario.**

Response: Please see response to specific comment number 2.

59. **Comment:** **Section 7.7.5, Page 7-20. This reviewer recommends interpretation of ambient soil beryllium to take into account the Bay Area regional background range for this element, given that no location Site 5 historical use (Old Boiler Plant) suggests beryllium or beryllium compounds were ever used by the Navy at the steam plant.**

Response: As is stated in the text, the likely source of beryllium at Site 5 is the artificial fill material. Regarding comparison to Bay Area soil concentrations, please see the specific responses to comment numbers 35 and 37.

60. **Comment:** **Section 7.7.5.2. Please compare recent ambient BAAQMD background concentrations of 1,2-DCE, PCE, TCE and petroleum constituents (e.g., benzene, toluene) to the values listed here. Are nearby or average BAAQMD locations greater, less than or about the same as the values referenced here?**

Response: Comment noted. The Navy will seek further discussion with DTSC for resolution of this comment prior to submittal of the final RI report.

61. **Comment:** **Page 7-18. Please compare Site 5 groundwater arsenic, copper, mercury and nickel concentrations to the ambient concentrations of these elements in groundwater at NAVSTA TI.**

Response: At present, ambient concentrations for metals in groundwater at NAVSTA TI have not been determined. However, as stated at the end of Section 7.8, "Conservative screening level modeling was then used to determine whether any of the chemicals of potential concern (COPC) would reach the Bay at concentrations above AWQC within 200 years. Arsenic, copper, mercury, and nickel were all predicted not to reach the Bay at levels above AWQC and so are not chemicals of concern (COC) in groundwater at Site 5." Since these metals do not appear to present an ecological risk, development of ambient concentrations does not appear necessary for Site 05 at this time.

62. **Comment:** **Page 8-3. From the text as presented, it appears that a variety of liquid waste was probably poured down the Building 335 floor drain, now a cement-patched area. Did this floor drain pipe remain intact, or is it cracked, broken or otherwise serve to convey these wastes to soil/groundwater beneath and/or nearby to Building 335?**

The current storm drain catch basin work (Section 8.6.3) would not necessarily account for the 5-10 gallon floor drain discharges/week over a 20 year history (P. 8-1).

Response: Comment noted. The Navy will seek further discussion with DTSC for resolution of this comment prior to submittal of the final RI report.

63. **Comment:** **Page 8-12. Please comment whether San Francisco municipal drinking water was used in any groundwater hydraulic punch, well drilling or other sample collection activities. Given that THM are characteristic of chlorinated drinking water, a 2 ppb chloroform finding is due to the incidental THM presence in sample collection waters.**

Response: San Francisco municipal drinking water was used in decontamination of various sampling equipment at NAVSTA TI followed by a final rinse with either distilled water or a high temperature steam rinse. Interpretation of potential "incidental" chloroform contamination from potable water sources will be included in the text as requested.

64. **Comment:** **Pages 8-13, 8-21. Please compare Site 7 and 10 soil metals concentrations to filtered ambient groundwater metals found at NAVSTA TI.**

Response: The Navy presumes that the comment meant to refer to Site 7 and 10 groundwater metals concentrations rather than soil concentrations. At present, ambient or background concentrations for metals in groundwater at YBI and NAVSTA TI have not been determined. The Navy began collecting filtered groundwater samples in 1998. Dissolved metals were not detected in filtered groundwater samples at concentrations exceeding the AWQC during 1998 groundwater sampling at Site 7/10. The recent groundwater data will be included in the final RI report. Based on the 1998 groundwater sampling results, the development of

ambient or background groundwater metals concentrations at YBI and NAVSTA TI does not appear to be warranted at this time. Also please see response to specific comment number 15.

65. **Comment:** **Section 8.7.1.4. Please compare Site 7 and 10 soils metals concentrations to Bay Area range of background for beryllium, silver and vanadium (attachments).**

Response: Please see response to specific comment number 35.

66. **Comment:** **Page 8-19. Typo: micro**

Response: The typo will be corrected.

67. **Comment:** **Section 8.9. Please describe how the 200 year criterion was established?**

Response: Since the screening level modeling was very conservative, 200 years was selected as a reasonable cutoff value for identifying ecological contaminants of concern. Please see section 6.2.1 of Appendix M, contaminant fate and transport modeling, for a detailed list of the conservative assumptions used in the screening level modeling. Clarification of the 200 year criterion will be included in text.

68. **Comment:** **Page 8-24, Section 8.9.3 Please indicate whether soil pH contributed to migration of copper, mercury, nickel and zinc.**

Response: It is unlikely that pH contributes to migration of listed metals. Measured pH in groundwater at Treasure Island ranged from 6.9 to 8.8 with the mean of 7.6, indicating the predominance of neutral to slightly alkaline conditions, resulting in reduced metal solubility and mobility.

Modeling was conducted to overestimate concentrations of metals at the shoreline. In particular, low sorption coefficients (Kd) were chosen for modeled metals (Kd values corresponding to a pH of 6.8 were used for modeling transport of metals). Based on conservative modeling, copper, mercury, nickel, and zinc were identified as ecological COCs at Site 07/10. However, the modeling used analytical results from the unfiltered metal samples, which are not representative of actual dissolved metal species in groundwater. Analytical results from filtered samples collected from well 10-MW01 in 1998 show that these metals do not exceed AWQC and should not be considered of concern. This will be clarified in the final RI report.

69. **Comment:** **Figure 9-1. For sludge disposal (YBI Site 8), it seems unlikely that the entire Army Point east end at YBI was the disposal area? Would not a specific or circumscribed location be a more likely dump?**

While the Navy has provided site history here (Section 9.1), it is not clear whether any visually evident sludge or its remnants remain anywhere in the area?

Response: The Navy will further research this issue including historical aerial photograph analysis. Any resulting clarification of disposal locations and evidence will be included in the final RI report.

70. **Comment:** **Section 9.6.3. Were surface water metals concentrations less than, greater than or the same as AWQC values?**

Response: The surface water metals concentrations will be compared with AWQC as requested.

71. **Comment:** **Section 9.7.1.3. Please compare site 8 soil aluminum, barium, beryllium, cobalt, copper, lead, manganese, mercury, nickel silver and vanadium to the range of Bay Area background concentrations (attachment). It may be appropriate to delete those metals from the site risk analysis should the values be consistent with off-site Bay Area background but are only slightly different from the immediate empirical data for TI and YBI.**

Response: Please see response to specific comment number 35.

72. **Comment:** **Sections 9.7.5, 9.9.2, and throughout. Since site 8 is directly downwind and directly beneath the Bay Bridge, is the lead measured as inorganic Pb or is tetraethyl Pb present in these areas? What is the relative source of contribution of weathered paint chips from the Bay Bridge as contrast to the Pb arising from military activities?**

Response: The samples were analyzed for inorganic lead. A general discussion and interpretation of potential relative contribution of lead from Bay Bridge and military activities will be added to the section as requested.

73. **Comment:** **Section 9.8.4. The review of ecologic risk is deferred here to HERD staff with specific expertise in such assessments. As the text is written, however, it appears that metals associated with sludge dumping pose a chronic discharge source by surface run-off to the Bay. The page 9-18 text would benefit from a clear presentation of Site 8 future land use for if residential/commercial buildings are indeed to be built at Site 8 and the old concrete foundations and sludge remains off-hauled and/or capped as a result of or prior to development, much of the concern from a practical point of view would be reduced.**

Response: Comment noted. The Navy will seek further discussion with DTSC for resolution of this comment prior to submittal of the final RI report.

REFERENCES

Bailey, S. 1992. "Breeding Birds Confirmed in 1991 on Treasure Island and/or Yerba Buena Island." Personal report to public affairs office at NAVSTA TI. March.

Blake, M.C., Jr., and others. 1974. *Preliminary Geologic Map of Marin and San Francisco Counties and Parts of Alameda, Contra Costa and Sonoma Counties, California.* U.S. Geological Survey. Miscellaneous Field Studies Map, MF 574.

California Department of Fish and Game, Natural Diversity Data Base (CNDDB). 1997.

CalTrans. Undated. Unpublished boring logs.

Dames and Moore. 1949. "Landslide Investigation Yerba Buena Island." U.S. Navy 12th District. September.

Dames and Moore. 1988. "Final Preliminary Assessment/Site Inspection of Naval Station Treasure Island." Prepared for the Naval Energy and Environmental Support Activity. April.

Feinstein, A. 1992. Personal Communication of Audubon Society Winter Bird Counts for NAVSTA TI. Golden Gate Chapter of the Audubon Society. General Sciences Corp.

Odencrantz, J.E., J.M. Farr, and C.E. Robinson. 1992. "Transport Model Parameter Sensitivity for Soil Cleanup Level Determinations Using SESOIL and AT123D in the Context of the California Leaking Underground Fuel Tank Field Manual." *Journal of Soil Contamination.* Vol. 1, no. 2, pp. 159-182.

PRC. 1993. "Storm Water Pollution Prevention Plan, Naval Station Treasure Island." Department of the Navy, Western Division, Naval Facilities Engineering Command. June 14.

PRC. 1994. Ecological Risk Assessment Site Walk Summary for June 3, June 15, and June 22, 1994.

PRC. 1997. "Phase II Ecological Risk Assessment Final Quality Assurance Project Plan, Naval Station Treasure Island." Engineering Field Activity West, Naval Facilities Engineering Command, San Bruno, California. February 3.

Radbruch, D.H. 1957. *Areal and Engineering Geology of the Oakland West Quadrangle, California.* U.S. Geological Survey. Miscellaneous Geologic Investigations. Map I-239.

Schlocker, Julius. 1974. *Geology of the San Francisco North Quadrangle.* U.S. Geological Survey Professional Paper 782.

State Water Resources Control Board (SWRCB). 1993. *California Enclosed Bays and Estuaries Plan.*

Tetra Tech, EM Inc. (TtEMI). 1998a. "Validation Study for Sites 11, 28, and 29 Final Work Plan/Field

Sampling Plan Naval Station Treasure Island, San Francisco, California." Engineering Field Activity West, Naval Facilities Engineering Command, San Bruno, California. November.

TtEMI. 1998b. "Technical Memorandum Bird Survey Results for the Validation Study for Sites 11, 28, and 29, Naval Station Treasure Island, San Francisco, California. Engineering Field Activity West, Naval Facilities Engineering Command, San Bruno, California. October 9.

TtEMI. 1999. "Draft Final Remedial Investigation Offshore Operable Unit, Naval Station Treasure Island., San Francisco, California." Engineering Field Activity West, Naval Facilities Engineering Command, San Bruno, California. March.

U.S. Environmental Protection Agency (EPA). 1985. "AT123D: Analytical Transient One-, Two-, and Three-Dimensional Simulation of Waste Transport in the Aquifer System." Office of Toxic Substances. ORNL-5602.

EPA. 1993. "Compilation of Ground-Water Models." EPA/600/R-93/118. May.

Yeh, G.T. 1981. "AT123D: Analytical Transient One-, Two-, and Three-Dimensional Simulation of Waste Transport in the Aquifer System." Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee. Publication No. 1439.

RESPONSE TO DTSC-HERD COMMENTS ON VOLUME 2 OF THE DRAFT FINAL ONSHORE REMEDIAL INVESTIGATION REPORT, NAVAL STATION TREASURE ISLAND

This document presents the Navy's responses to comments from the Department of Toxic Substances Control's (DTSC) Human and Ecological Risk Division (HERD) on Volume 2 of the draft final onshore remedial investigation (RI) report for Naval Station Treasure Island (NAVSTA TI), dated September 1997. The comments are dated December 16, 1997.

GENERAL COMMENT

Comment: **Volume II concerns the former foundry (Site 9), YBI Landfill (Site 11) and the Old Bunker Area (Site 12). Since the drafting of these documents, the NAVSTA TI has been closed; the introductions to these sections should be updated to indicate same; for the large 90 acre 'Old Bunker Area' in sections where military housing is built, please indicate whether the homes are currently occupied, and if so, what are the population demographics of the occupants?**

Response: The most recent occupancy status of housing will be included in the final RI report.

SPECIFIC COMMENTS

1. **Comment:** **Page 10-2, Section 10.3. It would assist the reader in descriptions presented here to note the physical condition of the Bldg. 41 foundry/paintshop/welding school/wood shop/vehicle repair and maintenance facility. For example, is the floor intact? Is there visual evidence of hydraulic fluid leaking from the 30-gallon storage tank? Is the floor drain intact or is it cracked, broken or otherwise in disrepair so as to permit leaking of shop solvents, oils and other materials into surrounding soils? Is there evidence that the concrete floor or other features of the building itself are free of contamination?**

   Response: A more detailed description of the physical condition of Building 41 will be added to Section 10.1, "Site Description and Operational History." Relevant portions of the detailed description will be included in Section 10.3, "Site Conceptual Model."

2. **Comment:** **Page 10-3, Section 10.4. From the text as written, it is not clear how the four soil boring locations were selected or whether four samples are adequate to characterize the facility. Why would one collect floor drain water samples when the facility is currently a wood shop? Is it not more likely past solvent disposal/release during paint shop activity would have leaked from the floor drain in Building 41 ? Does the 30-gallon storage tank contain hydraulic oil or other materials or is it presently empty? Does the "hydraulic lift trench" show visible oily stain or residues.**

   From the text as written, it is very difficult to determine why the various "field activity" described here represent a comprehensive (in this context, please note the title of the documentation: "Comprehensive Long-Term Environmental Action Navy.) evaluation of Bldg. 41 and if so, what rationale is used to reach that conclusion?

Response: The rationale for selection of sampling locations was presented in detail in the Phase I and II RI field work plans for NAVSTA TI. Some of the details from those plans will be added to Section 10.4 to explain the Site 09 sampling locations, as requested.

3. **Comment:** **Page 10-4, Section 10.4.1.2; Table 10-1. It is not clear from Figure 10-1 and the text how the soil boring locations and numbers were determined; while site characterization may, in fact, be adequate, the text does not communicate that position and supporting rationale to that effect is missing. Are the locations given in the figure beneath an intact concrete floor or are these taken in bare soil? Would not borings just to the north of the former paint booth directly adjacent to Bldg. 41 be more likely to reveal potential contamination?**

Response: Please see response to specific comment number 2.

4. **Comment:** **Page 10-6, Section 10.4-2. What is the meaning of the phrase, "...result of repeatedly poor sample recovery"? Why were only three of the 35 total (Table 10-1) soil samples analyzed for Cr+6?**

Response: The phrase cited means that due to subsurface conditions at these locations, the Geoprobe macro-core sampling spoon did not contain soil when retrieved from the boring, even after repeated attempts. Analysis for hexavalent chromium was not originally planned in the Phase IIB field work plan. Analysis for hexavalent chrome was added for Site 09 to determine whether there was any hexavalent chromium in soils from previous forge and foundry activities. Both of these issues will be clarified in the text.

5. **Comment:** **Page 10-9. Since PCB concentrations in soil increased "with depth at location 09-HP003," why were no analytical results at depths greater than 1 foot bgs presented?**

Response: Results of the polychlorinated biphenyls (PCB) immunoassay analysis for the 0.5- to 1.0-foot below ground surface (bgs) soil sample for boring 09-HP003 indicated concentrations of PCBs in the range of 0.5 to 1.0 milligrams per kilogram (mg/kg). However, laboratory analysis of the same soil sample did not detect measurable levels of PCBs, indicating that the immunoassay result was a false positive. This will be clarified in the text.

6. **Comment:** **Page 10-10. While it is clear that diesel fuel cut hydrocarbons contaminate soil (38,000 ppm) at Bldg. 41. the lateral and vertical extent of this problem is not evident from the presentation.**

Response: This issue is addressed in detail in Section 10.9.1, "Evaluation of the Adequacy of Data Collection," which reads as follows:

> Soil and groundwater contamination in the former lift system trench area was characterized by analysis of soil and groundwater samples from locations directly beside the trenches (09-HP001 and 09-HP002) as well as analysis of samples from locations within an approximate 50-foot radius of the trench area (see Figure 10-1). The combination

of TPH-i field screening and off-site laboratory analyses provided data over a broad enough area to draw conclusions about TPH contamination emanating from the trench area.

7. **Comment:** **Page 10-11. It is not clear why analyses for metals in groundwater were restricted to inorganic lead (Section 10. 6.2)? Why are only unfiltered data presented here? Are not the environmentally/toxicologically relevant endpoints associated with concentrations of metals in filtered groundwater?**

Response: Analysis for inorganic lead will detect both inorganic and organic lead forms. Further, organic lead will break down to inorganic lead over time. Filtered groundwater samples were collected for metals analysis in 1998; this data will be included in the final RI report.

8. **Comment:** **Page 10-12. Monitoring Well Survey. Are data available for filtered groundwater samples? At a minimum, the results summarized here should be compared (arsenic, chromium copper, lead, mercury, nickel, zinc) to ambient TI metals groundwater concentrations and to results for filtered groundwater analyses.**

Response: The Navy began collecting filtered groundwater samples in 1998. Dissolved metals were not detected in filtered groundwater samples at concentrations exceeding the ambient water quality criteria (AWQC) during 1998 groundwater sampling at Site 09. The recent groundwater data will be included in the final RI report. Based on the 1998 sampling results, development of ambient or background groundwater metals concentrations at Yerba Buena Island (YBI) and TI does not appear to be warranted at this time. (Also please see responses to DTSC-HERD specific comment numbers 15 and 64 on Volume 1 of the draft final RI report.

9. **Comment:** **Page 10-14. Section 10.7.1.3. Ambient metals comparisons should be completed for groundwater just as has been done for artificial fill soil/rock per se.**

Response: Since dissolved metals from well 09-MW01 did not exceed AWQC during 1998 groundwater sampling, development of ambient or background groundwater metals concentrations at TI does not appear to be warranted at this time.

10. **Comment:** **Section 10.7.2.2. Media of Concern. The media of concern listed is limited to soil only; however, it is apparent that oily tanks, pits and other features of the two buildings themselves at Site 09 are stained, filty (sic) or otherwise possibly contaminated. PCBs were apparently eliminated due to gross oil interference with the analysis - leading to a 10 ppm detection limit (Section 10.6.3) - a value far in excess of any candidate ARAR (e.g., < 1 ppm at soil surface, 40 CFR 76 1). How do non-porous surface PCB ARAR values (< 10 µg/100 cms) compare to PCB concentrations, if any, in the features in the buildings stained with oil at Site 09? Are the structures themselves contaminated and if not, what data are available to show that this is, indeed, the case? Are PCBs present or do the authors intend to carry out risk assessment calculations assuming values greater than ARAR in soils and concrete or other paving surfaces at the one-half limit of detection? Why are the samples not cleaned up prior- to analyses for PCBs?**

Were any ambient air samples collected at the site? If not, why not? Why are only 'qualitative' comparisons made using flux chamber extrapolations?

Response: Because PCBs were analyzed using immunoassay methods, the data is considered semi-quantitative and is not appropriate for use in a quantitative human health risk assessment.

Based on an agreement involving the Navy, DTSC, the U.S. Environmental Protection Agency (EPA), and the Regional Water Quality Control Board (RWQCB), flux chamber samples were collected at the "worst-case" sites only. It was further agreed that the information obtained for these sites would be used as a basis for comparison for other sites. For more information on the agreement, please see response to specific comment number 14.

11. **Comment:** **Page 10-16, Section 10.7.3 As stated 'in previous reviews, the use of aromatic constituents-based approach for diesel fuel and waste crankcase oil/hydraulic oil cannot be considered comprehensive inasmuch as benzene, xylene, toluene and ethylbenzene are present even in fresh fuel at only minimal concentrations (benzene = 0.01-0.082 ppm; toluene = 0.25-4.7 ppm; ethyl benzene = 0.17-0.43 ppm; xylene=0.66-2.5ppm), and are virtually non-existent in the heavier cuts. The diesel assessment would be handled most directly using a whole-product approach as outlined in Milner et al. *(J. Soil Contam.* 1(2): 103-157, 1992).**

Response: Please see response to DTSC-HERD specific comment 34 of Volume 1 of the draft final RI report.

12. **Comment:** **Page 10-17, Section 10. 7.5.1 Please discuss a) any possible historic use of beryllium or its compounds at site 09 and b) compare soil beryllium to regional (Bay Area only) background data for the range of beryllium concentrations in East Bay and Presidio formations prior to including soil beryllium results here.**

Response: As stated on pages 10-21 and 10-22 and in Table 10-12, the source of beryllium in soil at Site 09 is unknown and is likely to be related to the presence of metals in the fill material. Regarding comparison of beryllium in site soils to Bay Area values, please see response to DTSC-HERD specific comment 35 on Volume 1 of the draft final RI report .

13. **Comment:** **Page 10-18. Please expand the discussion of a) soil lead concentration mean and range. b) compare and contrast adult blood Pb results, normal child blood Pb predictions to the predicted results for the assumed pica child. Identify the percentage of the assumed residential population classified as pica children.**

Response: The range of lead values detected at Site 09 is presented in Tables 10-10 and 10-11. The blood lead results are summarized in Tables 10-12 through 10-14, and the blood lead spreadsheets are shown in Appendix G on pages G-2-13 through G-2-18. Blood lead concentrations associated with ambient and background concentrations are presented in Attachment G-4 of Appendix G.

14. **Comment:** **Page 10-18. Why were no ambient air samples collected both inside and outside the two buildings at Site 09? Why are no direct comparisons made to Bay Area background air measurements published by the BAAQMD for the VOCS? The conclusion, "Thus, it is likely that the VOC concentrations in air at Site 09 are lower than those at the three monitored sites described in Appendix I," is speculative. No empirical data are supplied which support directly the conclusion drawn.**

Response: The technical approach for evaluating the inhalation pathway was originally presented by the Navy at the remedial project managers (RPM) and Base Realignment and Closure (BRAC) Cleanup Team (BCT) meeting on December 13, 1995, and was presented in detail in a technical memorandum submitted February 5, 1997. The final technical memorandum is included in the RI report as Appendix I. It is the Navy's understanding that agency consensus had been reached on this issue.

Using flux chamber sampling, outdoor volatile organic compound (VOC) concentrations were calculated at the sites with the highest concentrations of VOCs in groundwater (Sites 6, 22, and 24). These estimated concentrations were compared to EPA Region IX preliminary remediation goals (PRG) to evaluate potential human health risk at each site, and it was determined that outdoor air concentrations at Sites 6, 22, and 24 were below PRGs. Because these sites have the highest concentrations of VOCs in groundwater and can therefore be assumed to reflect worst-case conditions, it is not speculative to infer that sites with lower concentrations of groundwater would also have outdoor air concentrations below the PRGs. Direct measurement of outdoor air at all sites would be costly and unnecessary.

15. **Comment:** **Page 10-19, Section 10.8. Unless supported by a defined use plan with assurance that future activities will, in fact, occur as stated (e.g., "in the event that the pavement is removed from these sites, it is likely that it will be replaced with additional buildings, lawns or landscaped areas."), the lack of an ecologic risk assessment here makes the document incomplete.**

Response: Comment noted. The Navy will seek further discussion with DTSC for resolution of this comment prior to submittal of the final RI report.

16. **Comment:** **Page 10-20. Include parenthetical soil concentrations of acetone and toluene in the text along with residential PRG values for ready comparisons. Indicate whether toluene and acetone are present in groundwater at Building 41 as supporting or detracting from the conclusion that the data "does not indicate a plume of contamination".**

Response: The requested information will be added to the text.

17. **Comment:** **Page 10-20, Section 10.9.1 Are soil beryllium concentrations listed here (0.2-0.4 ppm) (residential PRG = 0.1 ppm) consistent with Bay Area background range for this metal? Given the observations of 0.73-0.96 ppm beryllium at 09-SBO3), and in the absence of comparisons to Bay Area background (e.g., Presidio of San Francisco, Lawrence Berkeley National Laboratory) by comparative lithology, the conclusion, "The source of beryllium is likely to be related to the presence of metals in artificial fill material since there is no known source of beryllium at this site." is speculative.**

Response: Please see response to DTSC-HERD specific comment 35 of Volume 1 of the draft RI report.

18. **Comment:** **Page 10-2 1. It would be helpful to compare the soil diesel fuel concentrations (21-38,000 ppm) in the former lift system trench to the values published by Milner et al. *[Journal of Soil Contamination* 1(2): 103-157, 1992). The text fails to highlight a) the diesel fuel source: tanks? pipes? Spillage? vehicle washing operations? b) the lateral and vertical extent and the volume of soil affected by the diesel fuel problem. The text would be improved by simply presenting the total volume and location(s) of the diesel fuel problem at Site 09.**

Response: Comment noted. The Navy will seek further discussion with DTSC for resolution of this comment prior to submittal of the final RI report.

19. **Comment:** **Page 10-21, Section 10.10. It appears from the text as written (" No COCs in groundwater are identified at Site 09 based on ecotoxicologic testing for the development of screening levels...") that deep soil petroleum at 12,000-38,000 is a source for continued degradation of site groundwater?**

Response: At Site 09, total petroleum hydrocarbons (TPH)-extractables were not detected in 1998 groundwater sampling. While high concentrations of TPH-extractables were detected in soils near the former lift system trenches, the TPH does not appear to be partitioning to groundwater based on recent groundwater sampling results. The 1998 groundwater results and the above interpretation will be added to the text.

20. **Comment:** **Pages 10-21, 10-23. The Fate and Transport section presented here is wholly inadequate. A comprehensive and quantitative analysis should be included here, particularly as regards the petroleum found at 7 feet bgs. The no action proposed in Section 10.11 is not at all supported by any quantitative data at all.**

Response: Section 10.10, "Fate and Transport of Chemicals of Concern," will be further detailed to quantitatively support the conclusions and recommendations for Site 09.

21. **Comment:** **Page 11.1. What is the meaning of the phrase, "shrubbery that is regularly cut or turned under"?**

Response: The sentence will be revised to read, "The surface of Site 11 consists of bare soil, grass, and shrubs. As part of Navy maintenance activities, the surface area was regularly scarified to control growth of the grass and shrubs."

22. **Comment:** **Page 11.1. From the text as written, this reviewer must conclude that site characterization at YBI Landfill (IR Site 11) must be incomplete ("The USTs and fuel pipeline may be sources of contamination and will be investigated..."). It would appear to make more sense to have deferred any risk analysis or determinations of future management options until the UST areas have been characterized fully, including analyses of soil and groundwater, during UST remediation activities and confirmation sampling is complete.**

It is not clear why UST 270 (which is said to lie not within the landfill area) is addressed here or how it relates to YBI Landfill Site 11?

Response: Underground storage tank (UST) 270 is mentioned in the background section because it may be a source for TPH in groundwater at Site 11. The text will be revised to read as follows:

> Additional sources of contamination at the landfill include three former USTs and a former fuel pipeline, shown on Figure 11-1. UST 270 is not within the landfill area itself, but is crossgradient of the landfill. UST 204A and UST 204B are within the limits of the landfill. All three USTs and the fuel line have been removed. Since UST 270 is not within the landfill, UST 270 and its associated fuel pipeline will be investigated under the Navy's UST program.

23. **Comment:** **Page 11-13. In text discussion, please include a summary of the total numbers of samples analyzed for each petroleum ('TPH') fraction, the numbers of positive findings and the mean and range of the concentrations for each material found. Please indicate whether these locations are within the YBI landfill itself and/or whether they are located up- or down-gradient of the landfill proper.**

Response: The text will be revised as requested.

24. **Comment:** **Pages 11-14, 11-15. Please list the PAH concentrations (including the range, the maximum and as appropriate the average) and locations where such were found in the text. By location, please indicate whether these materials are associated with normal concentrations found in diesel fuels (IARC Monographs on the Evaluation of Carcinogenic Risks to Humans: Occupational Exposure in Petroleum Refining, Crude Oil and Major Petroleum Fuels, Vol. 45, pp. 72-77, Lyon, France, 1989) or whether this is due to waste crankcase oils or other wastes contaminated with PAH. Please provide an explanation why concentrations are greater in November and May than in February. Is this due to diesel fuel dissolution of otherwise generally immobile PAH compounds to facilitate their movement into groundwater?**

Response: The text will be revised as requested.

25. **Comment:** **Page 11-15. Please list the concentration range for each metal appearing here and compare the concentration to background metals concentrations at both YBI and TI.**

Response: Groundwater analytical results are presented in Table 11-5 and Figure 11-9. Metal concentrations cannot be compared to background concentrations, because no background concentrations have been established for groundwater at TI and YBI.

26. **Comment:** **Page 11-2, Section 11.2. Describe the total volume, lateral and vertical extent of the YBI Landfill. When did garbage disposal at Site 11 cease? When was a soil cover (p. 11-8) installed? Please indicate whether UST 270 was located up- or down-gradient from the YBI landfill? What was the disposition of the soil with the 61,000 ppm diesel? Was the entire 150 square foot contaminated area contained, removed or otherwise addressed in 1990?**

Are data or records available on the source(s) of fill material at YBI Landfill (IR Site 11)? Do lithologic records confirm the same landfill materials as make up TI proper? Some clear assurance of this point is needed here.

Response: There is no documentation or records on sources of fill or garbage disposal for the YBI landfill. The Navy will use lithologic data from boring logs and aerial photographs to roughly estimate the extent of fill material. Lithologic comparisons between the YBI landfill and TI will be clarified. The Navy will further research the questions concerning UST 270. All of the above will be clarified in the final RI report.

27. **Comment:** **Page 11-2.; 11-3. Are data/records available to preclude disposal of radioactive, liquid or hazardous waste (along with documented solid waste) burial at YBI Landfill?**

Response: There is no documentation or records on sources of fill or garbage disposal for the YBI landfill.

28. **Comment:** **Page 11-3. Given the size of the landfill, please justify in brief here how a total of 17 soil borings and 3 pits (to what depth? rationale for location selection?) are adequate to characterize fully the YBI Landfill size, composition and extent of contamination. The rationale provided (p. 11-5, "The exact locations of the test pits were selected based on the results of the surface geophysical survey..." tells the reader very little. On page 11-11, 22 different locations (total 90 soil samples) are mentioned, how does this relate to the pages 11-3 and 11-4 summary figures?**

Response: The borings were not used to characterize the size of the landfill; rather, a geophysical survey was conducted using a magnetometer to define the extent of the landfill. A total of 14 soil borings, 3 test pits, and 6 monitoring wells were installed to characterize the landfill. The number of samples collected per boring shown on page 11-3 will be revised to reflect the true range as detailed in Table 11-1. Page 11-11 will be revised to read, "A total of 90 soil samples from 20 locations (14 soil borings, 6 monitoring well borings, and 3 test pits) were analyzed during the phase I and IIB RIs."

The location and number of borings, test pits, and wells were selected in consultation with DTSC during the development of the phase I and IIB RI field work plans. Further, Section 11.9.1, "Evaluation of the Adequacy of Data

Collection," clarifies the objective and rationale of the landfill characterization activities:

> The objective of the RI at Site 11 was to define the extent of the landfill and to provide enough information on the nature of soil and groundwater contamination to apply the presumptive remedy for a landfill during the FS. The boundaries of the landfill area were delineated using GPR and confirmed with soil borings and hydraulic punch borings. Soil samples collected from test pits, soil borings, hydraulic punch borings, and monitoring well borings are sufficient to meet the RI objective of determining the nature and extent of soil contamination.

29. **Comment:** **Page 11-8, bottom; Page 11-9, top. A section of the text is missing.**

Response: The missing text will be added.

30. **Comment:** **Page 11-5. While TDS for 11-MW02, 11-MW04 and 11-MW07 is not given, please list and compare the PAH (as individual compounds and as total PAH concentrations) found in groundwater the 30-day average of 31 ng/L from SWRCB 93-5WQ for the California Enclosed Bays and Estuaries Plan or equivalent. What is the source of the PAH in these wells? Leaking fuels, waste crankcase oil dumped into the YBI Landfill?**

Response: To identify ecological contaminants of potential concern, constituents detected in groundwater were screened against AWQC. The water quality objectives for protection of saltwater aquatic life provided in the "California Enclosed Bays and Estuaries Plan" (State Water Resources Control Board [SWRCB]1993) are equivalent to AWQC with the exception of lead. To determine ecological contaminants of concern at NAVSTA TI, contaminant fate and transport modeling (Appendix M of RI report) used a screening level of 5.6 milligrams per liter (mg/L). This screening level is the water quality objective for protection of saltwater aquatic life published in the "Water Quality Control Plan For San Francisco Bay Basin" (RWQCB 1995). The values for organic constituents (polynuclear aromatic hydrocarbons [PAH]) provided in the "California Enclosed Bays and Estuaries Plan" are listed as objectives for protection of human health and have no ecological basis.

It is possible that the source of PAHs in these wells is leaking fuels, waste crankcase oil dumped into the YBI landfill, or a combination of both. However, given that the site is a landfill, definitive determination of the source of PAHs is unknown.

31. **Comment:** **Page 11-16. The weathered diesel fuel in Site 11 groundwater listed here ordinarily would not contain the elevated PAH concentrations found in MW02, MW04 and MW07 (e.g., W.H. Gliest et al. 1986. Comparative Chemical Characterization of Shale Oil - and Petroleum-Derived Diesel Fuels. DE86003310; Oak Ridge National Laboratory, Analytical Chemistry Division, Oak Ridge, TN).**

Please compare diesel fuel concentrations in Site 11 groundwater to ambient water quality criteria published for enclosed bays and estuaries for the individual constituents of the fuel (e.g., benzene 21 ug/L- isophorone

610ug/L; toluene 300 mg/L. Does the motor oil found here correspond to waste crankcase oil with elevated metals and PAH values? Dumping used motor oil into an uncontrolled 'landfill' has been a common historic practice both on private, public as well as military lands.

Please list the concentration ranges of and compare all chlorinated pesticide concentrations in groundwater- to their corresponding 93-5WQ SWRCB values.

Response: The range of chlorinated pesticides detected in groundwater will be added to the text.

With regard to the SWRCB's California enclosed bays and estuaries plan values, please see response to specific comment 30.

32. **Comment:** **Page 11-9, Section 11.7.2.2. Unless construction/excavation restrictions (by deed or- other administrative control) or removal of the YBI Landfill is complete, this reviewer cannot concur with the assumption that construction crews will not contact site groundwater during foundation/utility installation. Assuming contact to only 2 feet bgs at YBI cannot be justified from the rationale presented here. What is the basis for the statement. "Because it is likely that Site 11 may be used for commercial industrial and recreational purposes without any construction or- other activities that would disturb soils..."? Is Site 11 slated to become a visitor parking lot? DTSC Guidance (OSA- 1992, Use of Soil Concentration Data in Exposure Assessments) indicates that in the absence of information to the contrary, risk analyses should include consideration of depths to 10' bgs.**

Response: Please see response to DTSC-HERD specific comment 2 on Volume 1 of the draft final RI report.

33. **Comment:** **Pages 11-22; 11-24. Please review the beryllium issues presented here in light of comment # 17 (above).**

Response: Please see response to DTSC-HERD specific comment 35 on Volume 1 of the draft final RI report.

34. **Comment:** **Page 11-22. Were no empirical ambient air data collected at Site 11? The conclusion, "Thus, it is likely that the VOC concentrations in air at Site 11 are lower than those at the three monitored sites described in Appendix I", is speculation.**

Response: Please see response to DTSC-HERD specific comment 14.

35. **Comment:** **Page 11-25. Given that lead is found here at >5000 ppm please indicate also the pH of the soil samples in which the elevated Pb was detected. Please clarify, given the discussion of automobile exhaust Pb associated with proximity of Site 11 downwind of the Oakland-San Francisco Bay Bridge, whether the Pb referenced includes only inorganic Pb or whether analyses were conducted to determine tetraethyl Pb. A brief discussion of relative source contribution or attribution, if any, should be added here, with particular emphasis on surface soil deposition as contrast to Pb values found at increased depths.**

Response: At Site 11, only total lead was analyzed; tetraethyl (or organic) lead was not a target compound. Because only total lead was analyzed, no source contribution or attribution can be performed. The only information that could be used to evaluate the different sources is the depth of contamination. The highest concentrations of lead were detected at depth in the soil sample collected from the test pits 11-TP02 and 11-TP03. Surface soil concentrations of lead (in samples collected from less than 2.0 feet bgs) were generally lower than in the deep samples. The highest surface soil concentration of lead was 344 mg/kg.

The Navy is currently researching to identify past soil pH data for Site 11.

36. **Comment:** **Page 11-26. The authors should explain the page 11-35 risk management recommendations in light of the overall conclusion for terrestrial ecologic receptors. "Analytical results derived from food-chain evaluation indicated an unknown potential for risk to terrestrial mammals..."**

Response: The results of the food chain modeling performed for the RI determined that there are no significant impacts likely to occur to populations of small mammals, as represented by the deer mouse in the model. The model indicated the possibility of some adverse impact from the levels of certain chemicals at the sites; however, the Navy and regulatory agencies agreed at the November 4, 1997 meeting on the Proposed Ecological Validation Study for YBI that a small mammal validation study is not necessary (Tetra Tech EM Inc. [TtEMI] 1997). This decision was based on the small size of the sites (about 29 acres total), the disturbed nature of the sites, continuing disturbance of Sites 28 and 29, and likely remedial action for the landfill at Site 11, as stated in the comments submitted to DTSC on January 23, 1998 (TtEMI 1998a).

37. **Comment:** **Page 11-26. It appears that the authors are relying on the reproductive capacity of environmental species to overcome the impact of "chemical [waste] - related effects" proposed to be left behind at YBI? What is the meaning of the Navy's conclusion: "Thus, any potential adverse effects on individuals exposed to contamination at this location are not likely to affect small mammal populations as a whole"?**

Response: Please see response to DTSC specific comment number 36.

The risk assessment process assumes that small mammal and raptor guilds, other than threatened and endangered species, are to be protected at the population level, while the Peregrine Falcon, as an endangered species, must be protected at the level of the individual. Based on the evidence provided in the report, including the small size of the site and the disturbed nature of the site, population level effects from site chemicals are not expected for small mammals at Site 11.

38. **Comment:** **Page 11-27. As with the previous (#37) comment on mammals, what is the precise meaning of the Navy's conclusion regarding avian species: "...the effect on a few individuals [death? disease? in raptor populations?] will not reduce the local raptor population as a whole"? How many of the local raptors are calculated to be adversely affected by the contaminants at YBI and TI? Rather than limitation of the calculations to YBI Landfill given the author's observations, "Raptors tend to have larger territories (than Site 11?)...", should not the analyses presented here take into account total exposure to these animals from lead, organochlorine pesticides and other COC at TI/YBI in relation to the raptor's exposure due to environmental contaminants over the whole of the Bay Area or other defined locale? For migrating species, how do these conclusions apply?**

It must be noted here that treatment of relative source contribution in the current documentation is largely superficial. The analysis could be improved considerably in this regard.

Response: The Navy recognizes that ecological risk assessment is an uncertain science; however, an effort was made to use the best technical approach to determine what risks are posed to ecological receptors from site chemicals.

As stated in the response to DTSC specific comment number 38, the risk assessment process assumes that small mammal and raptor guilds, other than threatened and endangered species, are to be protected at the population level, while the Peregrine Falcon, as an endangered species, must be protected at the level of the individual. The results of the food-chain modeling using conservative assumptions indicated that no significant impacts are likely to occur to populations of raptors, as represented by the American kestrel in the model, based on the small fraction of the raptors' total home range that the sites represent.

Ideally, it would be known what the kestrel is exposed to throughout its home range and compare that with exposure scenarios at YBI. However, it is beyond the scope of this risk assessment to account for contaminants that receptors may encounter in other areas of their home range. For this reason, the amount of time the kestrel is likely to spend foraging at the site is accounted for in the model with a site use factor (SUF). An SUF was developed for each receptor based on the following ratio:

$$SUF = \text{IR Site Area (acres)} / \text{Home Range (acres)}$$

The SUF was reported as a proportion, with any values greater than unity converted to 1.0; values less than 1.0 were reported directly.

While every effort was made to identify site-specific exposure information, potential sources of uncertainty remain. To better account for potential uncertainty, two estimates of dose were calculated, one high and one low. High- and low-dose estimates were derived by incorporating the highest and lowest

values for each of the literature-derived, biological exposure parameters into the dose calculation. High and low values can be found in Tables J1-1 through J1-3; a more detailed description of the specific value derivation is Appendix J, Section 1.2.

For birds in general, uncertainties associated with site usage lead to variability in the estimate of potential risk. Therefore, within a feeding guild, species that occur all or part of the year at NAVSTA TI were selected for their potential exposure to contaminants; it is reasonable to assume that if year-round resident species are shown not to be at risk, then migrants are probably safe from chemicals at the site as well.

39. Comment: Page 11-27. Are Bay Area endangered plant species considered in the YBI/TI ecologic risk assessment as was done at the Presidio of San Francisco? If not, why not?

Response: A special status plant survey and habitat assessment was conducted for NAVSTA TI in 1996 (Tetra Tech, Inc. 1996). The report concluded that no federally-listed endangered, threatened or rare plant species were found during the surveys. However remnant plant populations uncommon in the city of San Francisco were found, including dune gilia (*Gilia capitata* ssp. *chamissonis*), Dutchman's pipevine (*Aristolochia californica*), large-flowered sand-spurrey (*Sperulariea macrotheca* var. *macrotheca*), yellow bush lupine (*Lupinus bicolor*), stinging phecelia (*Phacelia malvifolia*), fiesta flower (*Pholistoma auritum* var. *auritum*), common montia (*Claytonia exigua* ssp. *exigua*) and oso berry (*Oemleria cerasiformis*). Dune gilia was the only potential special status plant species present on YBI. It is being evaluated for addition to the California native plant species (CNPS) List 1B:3-3-3, which indicates that the CNPS considers the subspecies as rare and endangered in California, its occurrence is limited to only a few highly restricted populations, is endangered throughout its range, and is endemic to California. However, as of January 1999, this species was not added to the CNPS list (California Department of Fish and Game 1999).

40. Comment: Page 11-28. How do the conclusions on TPH (64,000ppm) and metals in groundwater justify a no action alternative at Site 11 (page 11-35)?

Response: As stated on page 11-35, Site 11 is recommended for further evaluation in a feasibility study. A no-action alternative is not proposed at Site 11.

Comments 41 through 71:

DTSC-HERD Volume 2 comments 41 through 71 all pertain to Site 12. Responses to these comments can be found in Appendix R of the draft Site 12 OU RI report.

REFERENCES

California Department of Fish and Game, Natural Diversity Data Base (CNDDB). 1999. January.

Regional Water Quality Control Board. 1995. "Water Quality Control Plan For San Francisco Bay Basin (Region 2)." June 21.

State Water Resources Control Board. 1993. "California Enclosed Bays and Estuaries Plan." 93-5WQ.

Tetra Tech EM Inc (TtEMI). 1998. "Validation Study for Sites 11, 28, and 29 Final Work Plan/Field Sampling Plan Naval Station Treasure Island, San Francisco, California." Engineering Field Activity West, Naval Facilities Engineering Command, San Bruno, California. November.

TtEMI. 1997. Conference Call Meeting Minutes. Conference call with regulatory agencies to discuss the Proposed Ecological Validation Study for YBI and Navy's response to overall comments on the ERA. November 4.

Tetra Tech Inc. 1996. "Final Special Status Plant Survey and Habitat Assessment for Naval Station Treasure Island, Yerba Buena Island, California." Engineering Field Activity West, Naval Facilities Engineering Command, San Bruno, California. November.

RESPONSE TO DTSC-HERD COMMENTS ON VOLUME 3 OF THE DRAFT FINAL ONSHORE REMEDIAL INVESTIGATION REPORT, NAVAL STATION TREASURE ISLAND SAN FRANCISCO, CALIFORNIA

This document presents the Navy's responses to comments from the Department of Toxic Substances Control's (DTSC) Human and Ecological Risk Division (HERD) on Volume 3 of the draft final onshore remedial investigation (RI) report for Naval Station Treasure Island, dated September 1997. The comments are dated January 8, 1998.

SPECIFIC COMMENTS

1. **Comment:** **Page 13-1, Figure 13-1. Please indicate in the text the import and relevance of the statement, "Site 17 is directly adjacent to and downgradient of Site 5, the old boiler plant". As written, it is not clear why this statement is highlighted; for example, do we have migration of fuels from Site 17 to Site 5; do we have migration of spilled fuels or other materials from Site 5 to Site 17?**

   Response: Clarification of the relationship between Sites 05 and 17 will be added. In addition, a section summarizing the contamination at Sites 05, 17, and 24B (the southern portion of Site 24 that includes the 5th Street fuel line) will be added to the final RI report.

2. **Comment:** **Pages 13-1, 13-2. Please describe the construction of and condition of the 200,000 gallon ASTs. Are these tanks still standing on site? Is the foundation intact? If the foundation made of impermeable materials? Please show, using Navy purchasing receipts or other documentation, that diesel fuel was the only material stored in these tanks since before 1943. Were PCBs or other oils ever stored in these tanks?**

   Response: The text will be amended to indicate the tanks are constructed of steel. As is indicated in the text, the tanks have not yet been dismantled. If the tanks are dismantled before the final RI report is completed, the text will be updated and information on the foundation will be added. The Navy will research the existence of any purchasing receipts for fuels stored in aboveground storage tanks (AST) 103 and 104; however, it appears highly unlikely that polychlorinated biphenyls (PCB) would be stored in 200,000-gallon ASTs that are connected to a fuel oil distribution pipeline.

3. **Comment:** **Figure 13-1, Page 13-1. It is difficult to understand the 5th street fuel line and how it relates to Site 17. Where does this fuel pipeline begin and end? What did (does) this fuel line contain? Is the 5th street fuel line considered part of Site 17 where it apparently crosses beneath Site 17? Where are located the "...some underground fuel (what kind ?) pipelines that run beneath the site in an east-west direction"? How deep are these lines and how many of them are there? What did (do) these lines contain? Are they connected to the AST at Site 17? What is the condition of these lines (intact? Broken? taken out of service? If taken out of service, what was the last date of their operation? How do these lines relate to the tanks 103 and 104?**

   Response: Removal and sampling of Treasure Island (TI) fuel pipelines was completed after the draft final RI report was submitted. All available history and relevant results and details from the fuel line removal and sampling will be added to the final RI report, as appropriate.

4. **Comment:** **Figure 13-1 is confusing. The tanks are located within the Site 17 boundary, but Building 455 and surrounding areas are not included in the fuel spill/oil spraying area? Do data exist to show that the site boundary is not arbitrary? It would be most helpful to delineate at the outset the initial location of the 20,000 gallon spill and whether the 130-220 foot lateral extent of the spill includes areas outside of the box designated Site 17 in the figure.**

Response: There is no documentation available showing the limits of the 20,000-gallon spill. The Site 17 boundary was aligned with the surrounding berm. With the exception of the area west of ASTs 103 and 104, which encompasses Site 05, the 130- to 200-foot spill radius surrounding ASTs 103 and 104 generally remains within the boundary of Site 17. It should also be noted that a new section summarizing the contamination at Sites 05, 17, and 24B (the southern portion of Site 24 that includes the 5th Street fuel line) will be added to the final RI report.

5. **Comment:** **Since the authors propose no CERCLA action (p. 13-23) and only the most vague reference to future monitoring and possible remediation of the fuel-soaked areas is given, some indication of the nature and extent of the apparently on-going fuel line/UST/AST tank removal program is helpful here. Are these activities similar to the U.S. Army Corps of Engineers FPALDR program at the Presidio [contact Mr. Roger Henderson or Mr. Brad Call, CESPK-ED-EF, 1325 J Street, Sacramento, CA 95814-2922;]? What soil cleanup values are deemed acceptable under those efforts? Are the tanks 103 and 104 to be demolished, fuel lines excavated and removed and fuel-soaked soils treated or removed? Reasonable detail and supporting references should be supplied at the outset of this section of the introduction to the CERCLA discussion here.**

Response: Further details regarding the underground storage tank (UST) program and petroleum sites at TI are provided in the draft corrective action plan, which was submitted to the Regional Water Quality Control Board (RWQCB) and DTSC. A reference to the corrective action plan will be added to the text of the final RI report (Tetra Tech EM Inc. [TtEMI] 1997).

6. **Comment:** **Page 13-4. Provide greater detail as to how the data collected (Section 13.4) "adequately characterized the extent of contamination"? This is important given the assumption that Site 17 soil contamination "was assumed to be limited with the berms" where no empiric data are supplied to support that assumption; cannot the spilled fuels and oils have soaked beneath and adjacent to the berms, perhaps to soils and groundwater beneath Building 455 and beneath the tanks themselves?**

Response: Additional detail will be added to Section 13.9.1, "Evaluation of Adequacy of Data Collection." The additional text will explain how the laboratory analytical data, immunoassay data, and field observations of contamination were combined to adequately characterize the extent of contamination. In addition, a new section summarizing the contamination at Sites 05, 17, and 24B (the southern portion of Site 24 that includes the 5th Street fuel line) will be added to the final RI report.

7. **Comment:** **Pages 13-1, 13-5. The text is confusing; while p. 13-1 is written in present tense (apparently tanks 103 and 104 remain on-site?), page 13-5 states that sampling was restricted because "...the ASTs had not been removed at time of sampling". Do these structures remain on-site? If not, when were they removed? If so, what is the schedule for their planned removal and what is to be their disposition? Why was vehicle access during sampling "in that**

area not possible (Section 13.4.2)?

Response: The text will be clarified to indicate that the tanks have not yet been dismantled. If the tanks are dismantled before the final RI report is completed, the text will be updated appropriately. The text cited on page 13-5 will be revised to read as follows:

> During the phase IIB RI, soil and groundwater samples were initially collected from seven locations rather than the nine locations specified in the work plan. Two proposed borings inside the bermed area could not be performed at the time of the field investigation because the ASTs had not yet been emptied, so the berm could not be breached to provide access for the Geoprobe rig.

8. **Comment:** **Page 13-7. Given that obvious fuel (and possibly other unspecified) odors were evident at sampling, why were no ambient air sampling efforts made here (pages 13-7 to 13-12)? Why were no air measurements made for benzene, carbon disulfide, PCE, toluene etc. that are found in soil and groundwater at this location?**

Response: Please see response to DTSC-HERD specific comment number 14 on Volume 2 of the draft final RI report.

9. **Comment:** **Page 13-8. At Site 5, what is the source of the BETX found? What is the relation between Site 5 and Site 17? A simple discussion of why the boundaries of Sites 5 and 17 are drawn as they are, what groundwater movement or inter-site transfer of contaminants is known, etc. would clarify the text presentation a great deal. For example, is there a concentration gradient between Site 5 and substances found at Site 17?**

Response: Please see response to specific comment number 1.

10. **Comment:** **Pages 13-8, 13-9. When discussing PAH concentrations (e.g., 34 ppm in soil), do the statements here concern only individual compounds or are the values listed the sum total of the PAH found?**

Response: The polynuclear aromatic hydrocarbon (PAH) concentrations discussed are for individual constituents. Additional detail on the constituent concentrations will be added to pages 13-8 and 13-9.

11. **Comment:** **Page 13-9. Why are Tables 13-3 and Figure 13-4 groundwater data limited to "TPH-i"? It appears important to determine and state clearly the type(s) of petroleum found in Site 17 groundwater; perhaps cross-reference here to another data set is in order?**

Please give an indication of the source (certainly not diesel fuel in tanks 103 and 104) of the PAH contamination. Was waste crankcase oil used in weed control around these tanks for fire suppression reasons?

Response: Throughout the RI report, the immunoassay data is presented separately from laboratory data. Potential PAH sources include the sources identified in the Section 13.3 site conceptual model, but they will be reiterated in this section as requested. As the preliminary assessment and site inspection (PA/SI) report states (Dames and Moore 1988), "The date, quantity, and source of the oil used (for weed control) were not identified and the waste oil may potentially have contained PCB." This will be clarified in Section 13.1 "Site Description and

Operational History."

12. **Comment:** **Page 13-10. Prior to reaching conclusions about soil aluminum, beryllium, silver, vanadium and zinc, please compare the concentrations of metals found in Site 17 soil and rock to Bay Area regional range of background values. Please also compare ambient TI groundwater metals concentrations to those found in Site 17 groundwater.**

Response: Since the TI ambient soil concentrations were derived empirically from site data and the Bay Area references were derived for soils with different lithologies than TI, a comparison between values may not be appropriate (please see response to DTSC-HERD specific comment number 35 on Volume 1 of the draft final RI report). Beryllium is the only metal exceeding ambient concentrations. There are no apparent sources of beryllium at Site 05. Should risk managers require remediation of beryllium at Site 05, the Navy may reevaluate the need for a statistical comparison of site metals to Bay Area ambient metals.

At present, ambient concentrations for metals in groundwater at TI have not been determined. However, as stated in Section 13.9,

> Mercury, nickel, and copper were detected in Site 17 unfiltered groundwater samples at concentrations exceeding the AWQC. These metals were detected at similar concentrations at Site 05, located adjacent to Site 17. Fate and transport modeling of mercury, nickel and copper at Site 05 predicted that these metals would not reach the shoreline. Based on this result, mercury, nickel, and copper are not considered groundwater COCs at Site 17.

Since these metals do not appear to present an ecological risk, development of ambient concentrations does not appear necessary for Site 17 at this time. Also please see response to DTSC-HERD specific comment number 35 on Volume 1 of the draft final RI report.

13. **Comment:** **Page 13-12. Please a) compare unfiltered groundwater metals concentrations at Site 17 to ambient metals concentrations in TI groundwater and b) supply groundwater metals concentrations in filtered groundwater samples, the latter to be compared to state and federal water quality criteria for enclosed bays and estuaries.**

Response: Please see the response to specific comment number 12 and DTSC-HERD specific comment number 12 on Volume 1 of the draft RI report.

14. **Comment:** **Page 13-11. How can PCE, TCE and vinyl chloride in Site 17 groundwater be attributed to, "The presence of these compounds is likely a result of petroleum contamination at the site"? Please list for each chemical discussed here the range of concentrations found in comparison to regulatory values (e.g., 22 CCR 64444, Article 5.5); in the absence of any such comparisons, the public will have considerable difficulty in determining the significance of the chemicals found and concentrations listed. As the text is written, it appears vinyl chloride is present in Site 17 groundwater at 10 ug/L? If so, a discussion of environmental reductive dehalogenation of the parent PCE and TCE with references to the published literature (e.g., *Appl. Environ. Microbiol.* 49: 1080-1083, 1985; Ibid 45: 1286-1294, 1983; *Waste Mgmt. Res.* 3: 357-360, 1985; *J. Amer. Water Works Assoc.* 76: 56-59, 1984; *Environ. Sci. Technol.*19: 277-279, 1985; *Environ. Toxicol. Chem.* 4: 739-742, 1985) including major intermediates and minor intermediates (e.g., trans-**

1,2-DCE) should be provided and rates of biotransformtion to vinyl chloride to the ultimate product CO2 here listed. Should the site remain undisturbed, what is the length of time required here for ultimate degradation of the chlorinated materials found to CO2 and H2O (e.g., P.R. Wood, R.F. Lang and I.L. Payan. 1985. Anaerobic transformation, transport and removal of chlorinated organics in groundwater. In Ground Water Quality. (C.H. Ward et al., eds.), pp. 493. Wiley, New York)?

Response: Comment noted. The Navy will seek further discussion with DTSC for resolution of this comment prior to submittal of the final RI report.

15. **Comment:** **Page 13-13, Section 13.7.1.2. Please compare calcium, iron, magnesium, potassium and sodium concentrations in Site 17 and ambient TI soil/rock (Volume 1, Table 3-5) to Bay Area background (preferably with mention of source lithology) prior to drawing conclusions about COPC for these elements. It would be helpful to reference and summarize the Volume 1, Table 3-5 information in brief in the text here.**

Response: Please see response to DTSC-HERD specific comment number 39 on Volume 1 of the draft final RI report.

16. **Comment:** **Page 13-14, Section 13.7.1.3. Please compare antimony, arsenic, barium, chromium, cobalt, copper, lead, manganese, mercury and nickel concentrations in Site 17 and ambient TI soil/rock to Bay Area background (preferably with mention of source lithology) prior to drawing conclusions about COPC for these elements. It would be helpful here to reference Volume 1, Table 3-4, in the text discussion.**

Response: Please see response to DTSC-HERD specific comment number 35 on Volume 1 of the draft final RI report.

17. **Comment:** **Page 13-14, Section 13.7.1.4 Please compare aluminum, beryllium, silver, vanadium and zinc concentrations in Site 17 and ambient TI soil/rock to Bay Area background (preferably with mention of source lithology) prior to drawing conclusions about COPC for these elements. It would be helpful to reference and discuss Table 3-4 from Volume 1 here is the text in relation to the concentrations in native Bay Area soil and rock.**

Response: Please see response to DTSC-HERD specific comment number 35 on Volume 1 of the draft final RI report.

18. **Comment:** **Page 13-15, Section 13.7.2.2. Since the spilled fuels, VOCs and SVOCs in groundwater can be contacted by future theme park construction workers, the present risk assessment is incomplete in the absence of consideration of that pathway.**

Response: Please see response to DTSC-HERD specific comment number 2 on Volume 1 of the draft final RI report.

19. **Comment:** **Page 13-15, 13-18. Why were no on-site ambient air analyses performed here given the acknowledged odors arising during soil sample collection?**

Response: Please see response to DTSC-HERD specific comment number 14 on Volume 2 of the draft final RI report.

20. **Comment:** **Page 13-16, Section 13.7.3. Provide toxicologic rationale, with citation to relevant published studies, for RfD surrogate selection. Why were the spilled petroleum fractions not evaluated on a whole-product basis, given that the selected indicator chemicals occur only a very low concentrations in these fuels/oils as fresh product and are nearly non-detectable upon weathering?**

Response: At a meeting of agency and Navy risk assessors held on September 14, 1995, it was agreed that only California Environmental Protection Agency (Cal/EPA) and U.S. Environmental Protection Agency (EPA) toxicity values would be used in the baseline human health risk assessment (BHHRA) for TI. At this meeting and at the Base Realignment and Closure (BRAC) cleanup team and Remedial Project Managers (BCT/RPM) meeting held November 6, 1995, it was agreed that the cost involved in developing toxicity values for compounds without approved values would be unwarranted. It was further agreed that compounds without toxicity values would be addressed on a compound-by-compound basis. It is the Navy's understanding that naphthalene was selected by the Navy and the agency toxicologists as the surrogate for phenanthrene, benzo(g,h,i)perylene, and 2-methylnaphthalene because the chemical structures are similar. Consistent with *Risk Assessment Guidance for Superfund* (EPA 1989), the known toxicologic activity of one compound may be used to estimate the toxicity of another structurally-related compound for which specific toxicity data is lacking. Although EPA guidance does not specifically identify naphthalene as a surrogate for these chemicals, the use of surrogates is recommended to avoid potentially underestimating the noncarcinogenic hazard indices for the site.

Regarding the evaluation of petroleum products using a constituent or whole product basis, please see response to DTSC-HERD specific comment number 34 on Volume 1 of the draft final RI report.

21. **Comment:** **Pages 13-18 and 13-19. The specifics of the "conservative NAVSTA TI groundwater model" as applied to Site 17 should be presented and discussed in detail here.**

Response: The specifics of the conservative modeling are detailed in Appendix M, "Contaminant Fate and Transport Modeling." A reference to Appendix M will be added to this section.

22. **Comment:** **Page 13-19. How was the 14,300 ppb diesel, gasoline and motor oil 'screening level' in Site 17 groundwater determined? Is this an acute toxicity value? How can one value be applied to petroleum products of such diverse toxicities and diverse physical properties?**

The groundwater pathway for construction workers is not necessarily incomplete (comment #17, above); why are Site 5 groundwater metals concentrations (unfiltered samples?) compared to those at Site 17? How do Site 5 and Site 17 groundwater metals concentrations compare to those for the whole of TI?

Response: Details of the derivation and application of total petroleum hydrocarbon (TPH) screening levels are presented in Appendix N, "Ecotoxicological Testing and Development of Petroleum Screening Levels." This reference will be updated. At the time of submittal of these responses, negotiation of TPH screening levels between the Navy and agencies continues. Final negotiated TPH screening levels will be included in the final RI report.

Regarding the groundwater pathway for the construction worker, please see response to DTSC-HERD specific comment number 2 on Volume 1 of the draft final RI report.

Concerning Site 5 and 17 concentrations of metals in groundwater, please see response to specific comment number 12.

23. **Comment:** **Page 13-20. Please discuss the toxicologic endpoint and methods used for motor oil (fresh? used? mineral-based? synthetic?) and diesel (No. 2? No. 1 (marine)? fresh? weathered?) (CAS Nos. 68476-31-3; 68476-30-2; 68476-34-6; 68334-30-5; 8008-20-6?) determination of the 430 ppm soil 'screening level'. Please define what the term "soil TPH screening level" means in practice.**

Response: Acute toxicity was used as part of the ecotoxicological testing to evaluate the site-specific toxicity of TPH to aquatic receptors. The toxicity was evaluated for all fractions of TPH (including weathered gasoline, diesel, and motor oil) collected from TI. Once the acute toxic effects of all fractions of TPH were determined, several correction factors were applied to the toxicity numbers to develop the threshold values. The correction factors included a factor of 2.0 to account for the additional toxic effects that might occur from chronic exposure. A complete discussion of the ecotoxicological testing is presented in Appendix N of the draft final RI report.

The soil TPH screening level is a conservative estimate of TPH concentrations that can remain in soil without affecting groundwater or surface water above concentrations considered to be protective of ecological receptors in San Francisco Bay. It can be applied to sites that are located close to the bay. Higher concentrations could be developed for sites that are located farther inland.

24. **Comment:** **Page 13-20. The Site 17 characterization appears inadequate; the authors apparently have no data on the lateral and vertical extent of the spills here, but have only assumed the contamination is limited to the bermed area?**

Response: Based on both the laboratory and immunoassay data, the Navy believes the lateral and vertical extent of contamination is sufficiently characterized.

25. **Comment:** **Page 13-21. The paragraph and conclusions concerning soil beryllium and source are speculation; please compare Site 17 soil beryllium to the range of concentrations in Bay Area rock/soil prior to arriving at any conclusions about beryllium here or any conclusions about fate and transport of this element.**

Response: Please see response to DTSC-HERD specific comment number 35 on Volume 1 of the draft final RI report.

26. **Comment:** **Page 13-21. Section 13.10. Provide references to published literature on the behavior of diesel and motor oil in soil and groundwater to substantiate the statements made here.**

Response: References will be added as requested.

27. **Comment:** **Page 13-21, 13-22. The discussion in 13.10 is diffuse and rambling. What empiric data are available to substantiate the assumption of anaerobic soil conditions at Site 17? The speculations detract from the presentation of the limited quantitative data available for this location. As written, do the authors intend to rely on "tidal flushing" to remediate the significant**

petroleum/PAH contamination here?

Response: The section will be revised to provide a more coherent and concise discussion of the fate and transport of chemicals of concern.

28. **Comment:** **Page 13-22. What are the concentrations of gasoline, diesel and heavy oils in groundwater beneath the fuel-soaked soil areas? What are the soil and groundwater concentrations of PAH and fuel components beneath tanks 103 and 104?**

Response: Where product is encountered in groundwater, it is cost effective to assume that dissolved fuel concentrations are present at solubility limits rather than conducting laboratory analyses. This will be clarified in the text. In addition, the text will be revised to include and interpret recent (1998) groundwater sampling data from downgradient well 17-MW01, where TPH was not detected.

29. **Comment:** **Given the extensive PAH contamination (well above the 1 ppm San Francisco/Los Angeles urban background for total PAH) that increases with depth bgs (Table 13-8: minimum detected 2' bgs = 86 ppm) at Site 17, this reviewer cannot agree with the page 13-23 conclusion that no CERCLA-directed action is warranted at Site 17. No information is given (page 13-20, Table 13-8) on Pah concentrations at depths greater than 2' bgs despite the increase in PAH values as depth increases?**

Response: The text will be further clarified to indicate that natural attenuation occurs at Site 17. At the time of submittal of these responses, negotiation of TPH screening levels between the Navy and agencies continues. Final negotiated TPH screening levels will be included in the final RI report. Also please see response to specific comment number 28.

30. **Comment:** **Section 14.1. Greater specifics are needed in the site history and description. What is the total area of Site 21? For the annual 270,000+ gallons of "waste oil from the ships" handled from 1946 at this facility, please indicate the type(s) of oil and their use history. Were these hydraulic oils, waste crankcase oils, Bunker C, other? Would one expect these oils (based on data from current operations of ships homeported elsewhere) to contain incomplete combustion products (e.g., PAH), elevated metals, etc? Please describe the types, nature and chromatographic results of oils handled in the bottomless 2000 gallon 'donuts'. What waste oil is stored in Building 325? What does the phrase (p. 14-1) "little staining is still visible" mean? How large is the stained area? Are historic photos and current photos available to document same? Please describe the TI-wide Navy program for removal of fuel lines, fuel farm and tanks; what specifically does the phrase, "The Navy is planning to remove the fuel line [and associated soils?] in 1997" mean? What this accomplished in 1997?**

Response: The Navy does not have documentation regarding either the type of waste oil or its use at Site 21. The Navy will review available historic aerial photographs for any observations of staining. Recent fuel line removal observations and sampling results relevant to Site 21 will be included in the final RI report.

31. **Comment:** **Figure 14-1. Either a figure legend or text discussion should be supplied to explain the rationale for site boundary selection. For example, why isn't the gangway area or Buildings 290, 325 and 289 and associated "PIPE" included here? Why isn't all of Pier 12 included here? While the site boundary may be justified as presented, no clear rationale for inclusion or exclusion of TI features is provided.**

Response: The rationale for the site boundary selection will be added to Section 14.1.

32. **Comment:** **Page 14-3. Please note that "chemical cleaners" for aircraft, automotive and other similar industries commonly include mineral spirits, Stoddard solvent and related light hydrocarbons in addition to TCE, PCE and similar chlorinated/fluorinated hydrocarbons. From the text description presented, it appears one of the principal problems here could be spilled, leaked or otherwise released diesel fuel which can dissolve PAH and related (normally relatively immobile) oil components and serve as a vehicle for dispersion.**

Response: Comment noted. The site conceptual model is intended to include all potential sources. When the analytical results are considered, the principal problem is apparent. The section will be clarified to indicate that solvents are the primary problem at the site.

33. **Comment:** **Page 14-4. Please describe the rationale for locations of the 23 soil borings across Site 21. Why were the 8 wells located in the areas selected? What justification is available to show that the numbers and locations of groundwater wells and soils borings is (are) adequate to characterize the nature and extent of contamination at Area 21? Why were soils sampled only to 5' bgs (due to groundwater at 5.9-6.7' bgs (p. 14-7)?**

Response: Additional sampling rationale will be added as requested.

34. **Comment:** **Page 14-5. Eleven soil borings were located "near the oil recovery system and fuel oil (Bunker C? marine diesel?) pipeline"; is the oil recovery facility still intact? What is the reason that soil directly beneath/adjacent to the oil separator was not sampled?**

Response: The oil recovery system has been dismantled. During a site walk to select sampling locations for the Phase IIB RI, the agencies (including DTSC) and Navy did not observe any evidence of release from the former oil recovery system, hence it was not directly targeted for sampling.

35. **Comment:** **Page 14-8, top line; Metals. Please compare Site 21 soil beryllium (0.21-0.27 ppm) and other metals to the range of Bay Area native rock/soil background (with indication of lithologic source material) prior to making any conclusions in this regard.**

Response: Please see response to DTSC-HERD specific comment number 35 on Volume 1 of the draft final RI report.

36. **Comment:** **Page 14-9. It would be helpful for the reader not familiar with the important of the VOC concentrations listed here to compare the concentration ranges to a regulatory (e.g., 22 CCR 64444) or other published benchmark. Please indicate in a brief discussion the apparent reductive dehalogenation of parent PCE and TCE to vinyl chloride with references to supporting published literature on the subject.**

Response: A comparison between the volatile organic compound (VOC) concentrations and AWQC will be added to the text. A brief discussion on reductive dehalogenation will be also added to the text of the final RI report.

37. **Comment:** **Page 14-5; Pages 14-9 and 14-10. The authors make effort to highlight their concern for dense nonaqueous phase liquids (DNAPL) at Site 21, yet no mention of this is made in Section 14.6.2. To what depth in groundwater does the PCE, TCE, TCA, DCA, DCE and VC extend below TI? Do these contaminated groundwaters (presumably brackish?) communicate directly with the waters of the Bay?**

Response: Groundwater was not sampled for dense nonaqueous phase liquids (DNAPL), but rather dissolved VOCs. The nature and extent of contamination is discussed in Section 14.9; fate and transport of chemicals of concern are discussed in Section 14.10.

38. **Comment:** **Page 14-11. Please supply groundwater metals concentrations from filtered samples here.**

Response: Filtered metals analysis was included in 1998 groundwater sampling at Site 21 and was not available for the draft final RI submitted in September 1997. This data will be included in the final RI report.

39. **Comment:** **Page 14-13. Please compare Site 21 soil calcium, iron, magnesium, potassium and sodium to Bay Area background concentrations, with indication of corresponding lithology.**

Response: Please see response to DTSC-HERD specific comment number 35 on Volume 1 of the draft final RI report.

40. **Comment:** **Page 14-13. Please compare Site 21 soil aluminum, arsenic, barium, chromium, cobalt, copper, lead, manganese, nickel, silver, thallium, vanadium, zinc and other metals retained as potential COC to Bay Area background prior to reaching the conclusions presented here. Conclusions about beryllium on page 14-21 are premature in the absence of such comparisons.**

Response: Please see response to DTSC-HERD specific comment number 35 on Volume 1 of the draft final RI report.

41. **Comment:** **Pages 14-14, 14-15. Since foundation and utility installation at any future film studio or other construction would entail intrusion into soil depths where vinyl chloride contamination would be encountered, it is important to include utility and construction worker dermal and inhalation risk by direct contact with chlorinated solvents, their degradation products, phenol, etc in soil from groundwater and soil and volatilization from groundwater and soil (as contrast to simple flux chamber extrapolations into ambient air through an asphalt or other barrier, p. 14-16).**

Response: Please see response to DTSC-HERD specific comment number 2 on Volume 1 of the draft final RI report.

42. **Comment:** **Page 14-17. Describe in detail the parameters, methods and assumptions used to substantiate the conclusion: "Conservative screening level modeling showed that the chlorinated solvents and metals in groundwater at Site 21 are not expected to reach the shoreline (over what period of time?) at concentrations exceeding the AWQC".**

Response: The parameters, methods, and assumptions used to substantiate the stated conclusion are detailed in Appendix M. A reference to Appendix M will be added to the text.

43. **Comment:** **Page 14-18. Unless prior administrative controls or other land use prohibit removal of the asphalt/concrete/building cover at Site 21 and in the absence of indoor and outdoor air monitoring data, due to the presence of vinyl chloride in Site 21 groundwater, this reviewer cannot concur with the conclusion that TPH-m "is the only COC in soil at Site 21". Should construction/excavation in vinyl chloride-affected areas occur at Site 21, release of this and related substances would be expected to occur.**

Response: Please see response to DTSC-HERD specific comment number 2 on Volume 1 of the draft final RI report.

44. **Comment:** **Page 14-18. Since no formal petroleum fate and transport analyses were completed, how can the conclusion be supported that the various "TPH" are not ecologic constituents of concern? Since a soil reservoir of fuel/oil can contribute to groundwater degradation and "may act as a future source of contaminants to aquatic receptors in the Bay", a comprehensive fate and transport analysis is needed here.**

Response: TPH was not detected in groundwater at Site 21 during 1998 groundwater sampling. This recent data will be included in the final RI report. Fate and transport modeling of TPH in groundwater will not be performed.

45. **Comment:** **Page 14-18. Rather than refer the reader to Site 24 analyses, it is preferable that the methods, assumptions, data and descriptions of all input parameters to determine DNAPL at Site 21 be provided here.**

Response: The information will be included as requested.

46. **Comment:** **Page 14-19, lines 3-4 from top. Please compare and contrast soil metals values to Bay Area ambient range of background concentrations; please compare metals concentrations in filtered Site 21 groundwater to the range of metals values in background (off-site reference) groundwater filtered prior to identification of arsenic, chromium, copper, lead, mercury and zinc as constituents of concern.**

Response: At present, ambient concentrations for metals in groundwater at TI have not been determined. Filtered metals analysis was included in 1998 groundwater sampling at Site 21, and results of this type of analysis were not available for the draft final RI, submitted in September 1997. Screening of the 1998 filtered metals analytical results from Site 21 wells against EPA AWQC, showed that no dissolved metals exceeded the AWQC. This information will be included in the final RI report.

47. **Comment:** **Page 14-19. For the chlorinated solvents, please delineate the extent to which the "solvent plume appears to extend towards the Bay". The statements here appear to contradict the p. 14-17 conclusion that chlorinated solvents in groundwater at Site 21 are not expected to reach the shoreline?**

Response: The statement will be clarified to indicate the estimated limits of the plume for a given isoconcentration. The conclusion cited, on page 14-17, states that the chlorinated solvents are not expected to reach the shoreline "at concentrations exceeding the AWQC."

48. **Comment:** **Page 14-20, Section 14.10.1. Please provide a robust discussion - with citations to key review papers and original data - on the fate and transport of motor oils in soil/groundwater environments. Please explain what is meant by the phrase, "The primary fate and transport .... bioaccumulation in living organisms"? Does this mean birds, fish, marine mammals, earthworms, humans?**

Response: Fate and transport of petroleum hydrocarbons (including motor oil) in soil and groundwater are detailed in Appendix L. A reference to Appendix L will be added to the text. The last two sentences in Section 14.10.1. will be revised to read, "The primary fate and transport mechanisms for TPH-m in soils are sorption and biodegradation. Bioaccumulation of TPH-m is not expected to be significant."

The primary effects from elevated concentrations of TPH-motor oil (TPH-m) to living organisms typically relate to the PAHs found in the oil (Irwin 1997). The bioaccumulation and effects of PAHs are presented in Appendix J, Section 2.8.10, and are summarized below.

The ability of PAHs to bioconcentrate and bioaccumulate is chemical-specific. The molecular weight, the position of the aromatic rings, and the type of substitutions all influence the ability of a compound to bioconcentrate and bioaccumulate in ecological receptors, including plants, fish, and mammals. Bioaccumulation factors (BCF) tend to increase with increasing molecular weight and increasing log K_{ow} values. Species-specific characteristics are also critical in evaluating the bioconcentration potential of PAHs; that is, organisms with relatively high lipid contents tend to bioconcentrate PAHs to greater levels than others (Eisler 1987). For high molecular weight PAHs, uptake and depuration may be critical in determining the long-term biological fate and effects of the chemicals.

The biological fate of PAHs in soils is poorly understood; however, much of the available information suggests that plants, fungi, and soil bacteria absorb lower molecular weight PAHs from soils. These materials may be available for uptake from the rhizosphere via the root (Agency for Toxic Substances and Disease Registry [ATSDR] 1995). Very little information was available on the effects of PAHs on invertebrates; however for birds, several investigations have suggested that the presence of PAHs in petroleum cause embryo toxicity in avian species (Hoffman and Gay 1981, Albers 1983, as cited in Eisler 1987). The majority of available information on the toxicological properties of PAHs is focused on their carcinogenicity to mammals, including the production of skin tumors, leukemia, lung adenoma, and stomach tumors (EPA 1980, Lee and Grant 1981, as cited in Eisler 1987).

49. **Comment:** **Section 14.11. Prior to reaching risk-based or source-based conclusions about soil beryllium, please compare and contrast TI soil/rock beryllium to**

the regional ambient concentration range for this element.

The discussion lacks a section on reductive dehalogenation of PCE and TCE; no mention is made of the ultimate or intermediate biodegradation products. While it may be true that Site 21 is now paved, unless clear assurances are put in place that the Navy will maintain the integrity of the asphalt parking lot/cap and control the spread of the PCE/TCE plume, a construction/utility worker exposure scenario during TI reuse (Section 14.8) having dermal (soil, groundwater) and inhalation (VOC) exposures should be included and the risks tabulated. Are data available to show that no vinyl chloride exists in these areas (Table 14-4)? The data presented (e.g., 199CC571; 199Q5035;

199Q6035; 199Q7035) indicate considerable microbiologic catabolism of the parent solvents. The risk of exposure to the volatile vinyl chloride, cis/trans-1,2-DCE, 1,1-DCE, TCE and PCE during construction and movement into and accumulations in indoor air of any future structure to be built on-site should be evaluated here.

Response: Regarding beryllium concentrations, please see response to DTSC-HERD specific comment number 35 of Volume 1 of the draft final RI report.

Regarding risks to the construction worker from soil and groundwater, please see response to DTSC-HERD specific comment number 2 of Volume 1 of the draft final RI report.

50. **Comment:** **Page 16-1, Table 16-1. Please provide data on sample collection depth; "Forty shallow soil samples..." Please indicate why no other metals (e.g., cadmium) were not included in the Blain investigation?**

Response: Samples were collected with intent of protecting workers applying the slope stabilization material, consequently the samples were analyzed for lead and zinc only and sample locations and depths were not carefully noted. This will be clarified in the text.

51. **Comment:** **Page 16-3. Please provide greater detail and reference to DTSC/EPA-approved rationale for selection of sampling locations.**

Response: Additional rationale for the selection of sampling locations will be added as requested.

52. **Comment:** **Page 16-4, Section 16.6.1. Please indicate pH of the soil samples.**

Response: The Navy is currently researching to identify any historical soil pH data for Site 28.

53. **Comment:** **Pages 16-5, 16-7. Please compare soil zinc and thallium concentrations to off-site regional Bay Area concentration range for these elements. Please compare the lead (inorganic? Tetraethyl lead?) concentrations listed to those along the freeway corridor (Appl. Occup. Environ. Hyg. 8(4): 217-220, 1993; Am. Ind. Hyg. Assoc. J. 54: 557-559, 1993).**

Response: Regarding comparison to Bay Area soil concentrations, please see response to DTSC-HERD specific comment number 35 of Volume 1 of the draft final RI report.

Comparison of the lead concentrations to those along the freeway corridor would not eliminate lead as a chemical of concern and would not change the conclusions or recommendations of the BHHRA. For this reason, the text will not be revised.

54. **Comment:** **Page 16-16. Section 16.9.2. Please clarify and restate at each point the 400 ppm USEPA PRG is referenced the underlying assumptions about unrestricted residential land use; it appears highly unlikely to this reviewer that single family homes will be built, sold and occupied that are directly beneath/adjacent to the Bay Bridge on- and off-ramps. The authors should also note here that the USEPA PRG for commercial/industrial land use values are exceeded or not, should provide a brief rationale for selection of the 400 ppm screening value and provide the environmental screening concentration (with rationale and references to the published literature) in order to place the soil Pb concentrations listed for Site 28 into perspective.**

Please also indicate whether the Pb analyses differentiate inorganic Pb from organic Pb (tetraethyl Pb and its decomposition products) arising from Bay Bridge vehicle emissions.

Since the most likely use of areas adjacent/beneath the Bay Bridge ramps would be recreational hikers/visitors, what exposure parameters and subsequent soil Pb value can be recommended for protection of human health?

Response: In the draft TI reuse plan, Site 28 is expected to remain an on-ramp/off-ramp in the future. The Navy agrees with the comment that it is highly unlikely that residential housing will be developed at these sites. However, based on a request from DTSC, the Navy has evaluated an unrestricted use scenario in the BHHRA for all sites at TI, including Site 28. The preliminary remediation goal (PRG) for lead of 400 parts per million (ppm) is given for comparison purposes only; no risk management decisions or recommendations have been based on the PRG for lead to-date.

In reference to the lead analysis, analytical methods used at NAVSTA TI are summarized in Table 3-2.

A summary of risks associated with recreational exposures to soil at Site 28 is provided in Table 16-9.

55. **Comment:** **Page 16-17, Section 16.10. Please indicate the soil pH at Site 28, the chemical species of the Pb found and the physical form (e.g., metal rebar, dust, paint chips, etc.) found here. How do statements like, "..the migration pathway is partly inhibited in areas where Site 28 is paved, except in areas where the pavement is cracked or broken", relate in any measurable or quantitative manner to the fate and transport issues discussed here? What does the statement, "Since the nature of groundwater occurrence at Site 28 has not been established...", mean?**

How can the fate and transport section be considered acceptable when: "...the migration potential of lead and other metals leaching through the shallow soil to the deeper soil and groundwater is unknown."?

Response: The Navy is currently researching to identify any historical soil pH data for Site 28. Soil samples at Site 28 were analyzed for inorganic lead only. Site 28 is primarily underlain by bedrock of the Franciscan Assemblage, which consists of fractured sandstone and shale bedrock. Consequently the volume and occurrence

of groundwater beneath Site 28 would be limited to the fractures within the bedrock. This information will be clarified in the text and used to reevaluate the migration potential of lead in soil to groundwater at Site 28.

56. **Comment:** **Page 16-19. General/vague statements with no clear relevance detract from the analysis presented:**

"Since the risk analysis for terrestrial vertebrates categorizes all sites at YBI as Category 2 sites [please define and indicate the significance, if any, of this categorization], risk management must be practiced within the context of the site and other components within the risk assessment."?

Response: Category 2 sites are explained in Section 16, Page 11 and on Table J3-6 of Appendix J.

In Category 2, hazard quotients (HQ) fall between the extreme Category 1 and Category 3 sites (for example, the worst case HQ is greater than unity, but the best case HQ is less than unity). Category 2 sites are not amenable to simple distinctions of risk, and a decision based on risk management is recommended for these sites.

57. **Comment:** **Section 16.11; Table 16-1. It should be noted that the lead concentrations listed (except 206-1913, 206-1915, 206-1902, 206-1924) and the Site 28 mean concentration, while greater than the soil inorganic Pb concentration normally considered acceptable for unrestricted (single family) residential exposure, the concentrations found are consistent with an industrial/ commercial (e.g., adults, no home gardening) exposure scenario. The conclusion as written is so vague that the reader cannot understand what the expensive site characterization/analysis has brought to the project to date and the significance of that effort. For example, what does a HQ of 6.92E+4 for the peregrine falcon mean? Does this indicate that all of YBI is Pb-contaminated to the point that it is an ecologic menace? Greater explanation with increased clarity and relevance is needed here.**

Response: Comment noted. The Navy will seek further discussion with DTSC for resolution of this comment prior to submittal of the final RI report. The Navy does not believe that all of Yerba Buena Island is "lead-contaminated to the point that is an ecologic menace."

REFERENCES

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. "Toxicological Profile for Polycyclic Aromatic Hydrocarbons." U.S. Department of Health and Human Services, Public Health Service. Atlanta, Georgia.

Dames and Moore. 1988. "Final Preliminary Assessment/Site Inspection of Naval Station Treasure Island." Prepared for the Naval Energy and Environmental Support Activity. April.

Eisler, R. 1987. "Polycyclic Aromatic Hydrocarbon Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review." U.S. Fish and Wildlife Service. Biological Report 85(1.11).

Hoffman, D. J., and M. L. Gay. 1981. "Embryotoxic Effects of Benzo[a]pyrene, Chrysene, and 7,12-Dimethylbenz[a]anthracene in Petroleum Hydrocarbon Mixtures in Mallard Ducks." *Journal of Toxicology and Environmental Health.* Volume 7. pp. 775-787.

Irwin, R.J. 1997. "Environmental Contaminants Encyclopedia, Total Petroleum Hydrocarbons (TPH) Entry." National Park Service, Water Resources Divisions, Water Operations Branch. Fort Collins, Colorado. July.

Tetra Tech EM Inc. 1997. "Draft Corrective Action Plan, Naval Station Treasure Island, San Francisco, California." November 17.

U.S. Environmental Protection Agency. 1989. "Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A), Interim Final." Office of Emergency and Remedial Response. EPA/540/1-89/002. December.

RESPONSE TO DTSC-HERD COMMENTS ON VOLUME 4 OF THE DRAFT FINAL ONSHORE REMEDIAL INVESTIGATION REPORT, NAVAL STATION TREASURE ISLAND

This document presents the Navy's responses to comments from Department of Toxic Substances Control's (DTSC) Human and Ecological Risk Division (HERD) on Volume 4 of the draft final onshore remedial investigation (RI) report for Naval Station Treasure Island (NAVSTA TI), dated September 1997. The comments are dated January 13, 1998.

SPECIFIC COMMENTS

1. **Comment:** **Appendix F. A discussion of off-site reference ("background") metals concentrations in TI and YBI groundwater should be added to the documentation.**

   Response: At present, ambient concentrations for metals in groundwater at Treasure Island (TI) have not been determined. Filtered metals analysis was conducted for the 1998 groundwater sampling at TI and Yerba Buena Island (YBI) and results of this type of analysis were not available for the draft final RI report, submitted in September 1997. Screening of the 1998 filtered metals analytical results from TI and YBI wells against U.S. Environmental Protection Agency (EPA) ambient water quality criteria (AWQC) showed that only a few dissolved metals in groundwater exceeded AWQC. Where these dissolved metals exceed AWQC, there is generally a site-related source for the metals. Therefore, the development of ambient metals concentrations in groundwater at TI and YBI did not appear to be warranted.

2. **Comment:** **Appendix F. A contrast and comparison of YBI and TI ambient ("background" or "off-site reference") metals concentrations in soil and rock [preferably by lithologic source] to the range of same in East Bay hills, San Francisco and other Bay Area locations (e.g., areas of fill material in Emeryville, Alameda, Mare Island) should be added (attachments). Are the values at YBI and TI consistent with, greater than or less than those found in other areas around the Bay?**

   Response: Please see responses to DTSC-HERD specific comment numbers 35 and 41 on Volume 1 of the draft final RI report.

3. **Comment:** **Appendix F. Discussion of world, U.S. and other such citations to soil metals concentrations (which by necessity include mines, ore deposits and unspecified/unrelated lithology) are largely irrelevant in the present context. Should the authors wish to include such bibliographic citations, appropriate qualifications with sufficient detail must be added in the text to explain the source of those data.**

   Response: There are no bibliographic references to world or U.S. metals concentrations in soil in Appendix F.

4. **Comment:** **Page F-1. Section 1.1. Please cite the applicable sections of EPA/540/1-89/002 in discussing the necessity of obtaining background concentrations for both naturally occurring (Section 5.7.3) and ubiquitous anthropogenic (Section 5.7.4) materials.**

   Response: The reference will be included as requested.

5. **Comment:** **Page F-3. Please insert a discussion of the date of TI infilling, the source(s) of the fill material and references to substantiate those claims. Please indicate where, when and the nature and source of the fill material at Site 11.**

Response: The requested information will be included. Concerning fill material at Site 11, please see response to DTSC-HERD specific comment number 26 on Volume 2 of the draft final RI report.

6. **Comment:** **Page F-5. Identify the materials which potentially confound/contribute to "source of contamination at Sites 28 and 29" here and throughout the text; please gives the names of each site at each point in the text where the site number is mentioned.**

Why were sites 8, 16, 28 and 29 "assumed to be geologically similar"? Are not borings data sufficient to establish whether these areas of colluvium/ marine sand are the same or similar lithology?

Response: A reference to the borelogs will be included to support the assertion that Sites 8, 16, 28, and 29 have similar lithology. A reference to the YBI geologic map and sampling locations will also be included to show that the soils sampled have similar geologic parent material.

7. **Comment:** **Page F-5. Please list and identify the "13 background locations" and describe how 21 borings (why not 13 borings?) (why not 21 locations with 21 borings?) are adequate to characterize adequately the site? The description as presented in the text is not clear. Was bedrock sampled?**

Response: The sampling approach will be described in more detail, as requested. The sampling approach was reviewed by the agencies, including DTSC, as indicated in the introduction of Appendix F. Bedrock was not sampled because the purpose of the study was to establish metals concentrations in soil, not bedrock.

8. **Comment:** **Pages F-6. F-8. Why were iron, magnesium etc. excluded from the background measurements? Other military (e.g., Presidio) sites have not used the rationale for exclusion from background measurements based on nutrition. Should the DTSC approve elimination of background determinations for arsenic because of the data on its essentiality in nutrition (arsenic has been shown to be an essential element in at least four mammalian species, National academy of Sciences, Drinking Water and Health, Vol. V, 1983)? It would appear that a toxicologic rationale would**

have no bearing on an element from a geologic point of view; some explanation of the basis for such an approach should be added to explain the approach taken.

Response: Please see response to DTSC-HERD specific comment number 39 of Volume 1 of the draft final RI report.

9. **Comment:** **Pages F-7, F-8. Cite references for all statements relating to fill source: "The fill material for TI was obtained primarily (were there secondary sources and, if so, what were those sources and where were those materials placed when constructing the island?) from San Francisco Bay sediments."**

Response: The only available reference to sources of fill material (Lee 1969) is included in the text. Charles Lee was the engineer in charge of constructing TI, and consequently is the best reference on fill sources for TI. Specifics of the bay sediment sources and lithologies, detailed in Section 2.3.2.1.1 of the RI report, will also be included in this section.

10. **Comment:** **Page F-8. It would assist the reader if relative source contribution data (e.g., as percentage of total 'major pollutant sources') were given. For instance, East Bay oil refineries (whose citations for selenium and other discharge to the Bay have been well publicized in Bay Area newspapers) are not mentioned.**

Response: The Navy is unaware of any documentation specifying the relative pollutant source contributions to bay sediments prior to the construction of TI in 1937.

11. **Comment:** **Page F-9. What is "current practice in the environmental industry"?**

Response: The phrase will be removed.

12. **Comment:** **Page F-9. Cite published DTSC and U.S. EPA guidance documents at each point that statements like, "DTSC recommends to use the 80th percent lower confidence limit on the 95th percentile..." are made in the text.**

Response: Please see responses to DTSC-HERD specific comment numbers 35 and 41 on Volume 1 of the draft final RI report. The requested references will be added to the text where appropriate.

13. **Comment:** **Page F-9. It is not clear why a 1/2 LOD is used to substitute an "ND" in a background metals study; the 1/2 LOD default is certainly applicable to a analysis of a groundwater plume of solvent, fuel or other waste material but the relevance of such an approach is not readily apparent here.**

Response: Comment noted. The Navy will seek further discussion with DTSC for resolution of this comment prior to submittal of the final RI report.

14. **Comment:** **Page F-10. Since the YBI data set is admittedly "small" (N=21), it becomes even more important to discuss the values in contrast to far more robust local background determinations (points #1 and 2, above) (e.g., Lawrence Berkeley National Laboratory N=498 background samples), and helps place into context the analytical difficulties described in Section 4.1.**

Response: While the Lawrence Berkeley National Laboratory may have a robust data set, the samples were collected in an entirely different soil lithology with different bedrock parent material, organic and eolian inputs, and weathering and soil development processes. A comparison between different soil lithologies is not appropriate. The background sampling approach, including the sample size, was reviewed by the agencies, including DTSC, as indicated in the introduction of Appendix F. The role of the regulatory agencies will be clarified in this section of the text. Also please see responses to DTSC-HERD specific comment numbers 35 and 41on Volume 1 of the draft final RI report.

15. **Comment:** **Section 4.2. Please compare and contrast the "outliers" eliminated using statistical justifications to the concentration range of naturally occurring metals in Bay Area soil and rock prior to making conclusions or arriving at artificially "conservative" (i.e., 'low') estimates of ambient levels".**

Response: Please see response to specific comment number 14.

16. **Comment:** **Section 4.3. Please compare YBI antimony, lead and zinc concentrations to a) the range and mean of antimony concentrations in East and West Bay background studies and b) compare the YBI soil antimony, lead and zinc concentrations by the same/similar lithology to the corresponding values in North, East, West and South Bay as available in DTSC Region H site characterization files and in the published literature; the same comparisons should be carried out for TI as well.**

Response: Please see response to specific comment number 14.

17. **Comment:** **Page F-14, Tables F-1 and F-2. Please include the results of summary comparisons with East and West Bay soil background metals concentrations.**

Response: Please see response to specific comment number 14.

18. **Comment:** **Page G-1, line 6 from bottom. Are not YBI and TI background metals values analyses found in Appendix F and not in Appendix K?**

Response: The text will be revised to indicate the correct appendix.

19. **Comment:** **Page G-3. Please define what constitutes a 'cursory review'?**

Response: The components of a cursory review are described in Section 3.0 of Appendix E.

20. **Comment:** **Page G-4, Section 3.0. As this section is written, it tells the reader very little except to see Section 3.7. It would assist the reader if a reasonably complete discussion of the exposure scenarios used (e.g., construction/utility worker, resident, commercial/industrial recreational) was given here and the rationale behind the assumptions around the selected exposure parameters (e.g., child soil ingestion, relevance of pica child exposure, etc.) - including but not limited to exclusion of domestic use of YBI/TI groundwater, the risk and exposure parameters for non-domestic use of YBI/TI groundwater and other details was provided.**

Response: Comment noted.

21. **Comment:** **Page G-5. As written, it is not clear how the parameters listed here actually relate to YBI/TI: for example, do TI residents actually live on-base for 30 years as stated? What, in fact, is the average length of residency among the people now living on TI? What is the longest recorded residential occupancy on TI or YBI? What is the measured soil organic carbon content at TI and YBI? Since organic carbon content is a necessary parameter for site-specific quantitative environmental fate and transport analyses, why is the only value given limited to default CAPCOA parameters? Would one not obtain more accurate results from the environmental fate and transport calculations if actual site conditions were used in those calculations? How does the 150 days/year recreational duration assumption actually compare to the current**

actual use patterns at TI and YBI? What kind(s) of activities do those visitors perform at YBI and TI? How does the 150 days/year assumption fit with the City of San Francisco reuse plan - surely one would not ordinarily visit an amusement park 3 days/week or every day of the year for 30 years? Please describe the basis of the 4.5 year commercial/industrial exposure scenario - is this the assumed duration of an amusement park construction project?

Response: The exposure parameter values used in the baseline human health risk assessment (BHHRA) are based on EPA and DTSC guidance with the exceptions noted in Section 3.2 of Appendix G. Prior to submittal of the draft RI report, numerous meetings were held at which the BHHRA methodology was discussed. After the draft RI report was submitted in October 1996, the Navy received comments from DTSC, EPA, and the Regional Water Quality Control Board (RWQCB). These comments were addressed in a meeting held April 4, 1997, and the comments and responses are presented in Appendix O of the RI report. None of the comments received questioned the exposure parameter values used in the BHHRA. Accordingly, the Navy believes consensus had been reached on this issue, and the exposure parameters will not be revised in the final RI report.

22. **Comment:** **Page G-9. It is not clear why a "whole product" approach (methods supplied previously to the authors) to evaluation of the toxicology of petroleum hydrocarbons was not also included in the present risk assessment? Since the indicator chemical (e.g., BTEX) approach is often not useful as the light aromatics were either not present in heavy fuels or have volatilized away or**

reached into groundwater and dissipated many years ago due to weathering of the parent materials or are otherwise degraded leaving behind the heavier fractions, how was the toxicology of the materials actually present in TI soil assessed?

Response: Please see response to DTSC-HERD specific comment number 34 of Volume 1 of the draft final RI report.

23. **Comment:** **Page G-10, Section 4.4. A brief discussion of the source, relevance and regulatory application of the 10 microgram/dL blood Pb value is in order here. As written, it appears as though the value is interpreted by the authors as though the concentration were a legally binding limit. For purposes of comparison, it is appropriate to reference the values listed in 8 CCR 5216 and 8 CCR 1532.1**

Response: The 10 microgram per deciliter (μg/dL) blood lead level is based on the California EPA (Cal/EPA) guidance referenced on page G-10, and is further explained in Section 3.7.3.4 of the RI report.

Regarding comparison to the values listed in Title 8 of the California Code of Regulations (CCR), Section 5215 and 1532.1, please see response to DTSC-HERD specific comment number 3 of Volume 1 of the draft final RI report.

24. **Comment:** **Page G-10. Please indicate the source(s) of TI and YBI drinking water here. Please also indicate whether any private or community produce gardens exist at TI and if so, whether any such activities actually occur at any of the problem areas evaluated in the 5 volume Onshore Remedial Investigation Report.**

Response: The drinking water lead concentration used in the blood-lead model is based on sampling of the drinking water currently used at TI. Homegrown produce is currently not grown at TI.

25. **Comment:** **Page G- 16, Section 6.2. The text as written is diffuse; the reader can gain no insight or understand the degree of confidence one can place in the results of the ecologic or human health risk analysis based on the approach, rationale and discussion presented here.**

Response: The uncertainty section in Appendix G is consistent with EPA and DTSC guidance. The purpose of the uncertainty section is present the assumptions and uncertainties inherent in the risk assessment in order to place the risk estimates in their proper perspective. Section 6 of Appendix G identifies the key site-related variables and assumptions that contribute most to the uncertainty in the BHHRA. A more detailed description of the uncertainties associated with the BHHRA will be presented in the final RI report.

26. **Comment:** **Tables G-1 to G-3. For each footnote listed as "see text for derivation", please provide which section of the 5 volume submission to which the phrase refers.**

Response: The text will be revised to refer to Section 3.2 of Appendix G.

27. **Comment:** **Table G-5. While the values listed appear to be default assumptions, a discussion of the basis of these values particularly for the fuels, should be addressed. It is simply not physiologically possible that percutaneous uptake of topical gasoline (ABS=0.1) is identical to that for a heavy motor oil (ABS=0.1); what are the data which support such assumptions? For all petroleum fractions, metals, PAH and pesticides listed, do the ABS numbers refer to neat compound or to compound as present in a soil matrix? As an example, please consider the numerous PAH (e.g., fluorene =0. 15; benzo(a)pyrene-0.15); based on the data of Yang et al. *(Toxicol. Ind. Health* 2: 409-415, 1986- Ibid 2: 79-84, 1986) and of Wester et al. *(Fund. Appl. Toxicol* 15: 510-516, 1990), it would appear that the percutaneous absorption of PAH from a soil matrix is 0.02, not the 0.15 value used in the present report. Please provide a clear rationale for each value selected; default regulatory values may have little relevance in the present context.**

Response: The dermal absorption fractions presented in Table G-5 were obtained from applicable Cal/EPA and EPA guidance. It is the Navy's position that standards accepted values be used rather than provisional values that have not been reviewed by the appropriate agencies. In addition, developing absorption fractions based on individual studies would require a substantial level of effort and would not substantially change the conclusions or recommendations of the RI. Accordingly, the text will not be revised in the final RI.

28. Comment: Attachment G- 1. This section is terrible. For each chemical listed in this section, please add U.S. EPA soil (residential and industrial) and ambient air PRG values; for each VOC listed, please add the most recent published BAAQMD ambient air background concentrations and indicate the value for the closest BAAQMD monitoring station to YBI/TI. Please list here also the applicable 8 CCR 5155 and 5216 PEL. For each toxicity summary here, please cite at the appropriate location in the text the applicable ATSDR summary along with all published references listed in the bibliography.

As written, the text is alarmist- for- example, on page G-1-4, "An acute oral dose of dieldrin (from soil?) causes salivation and convulsions..." "...increases cleft palate, open eye and webbed foot" and "...increase in postnatal death" (in humans?)" "Workers experienced headache, dizziness, hyperirritability, general malaise, nausea, vomiting, anorexia, muscle twitching and myoclonic jerking"(!) There is no explanation of a) dose, b) route of exposure, or whether any of the multitude of toxicologic consequences have anything whatsoever to do with the occurrence of residual concentrations of aldrin or dieldrin (likely used at TI/YBI to control structural termites under perfectly legal applications) in soil at TI. The

entire toxicity summary section needs to be revisited and the salient points about magnitude and duration of exposure (dose) and the margin of exposure at TMI in relation to that associated with the stated toxicologic consequence should be defined. For substances like the chlorinated pesticides, metals and PAH which are ubiquitous environmental chemicals, at a minimum the ATSDR summary of occurrence should be spelled out here. For chemicals like acetone where the results of controlled human inhalation trials have been published, the results of those studies should be summarized and included. For substances like aluminum dust where objective clinical consequence of human exposure is well known, provide the details of the magnitude and duration of human exposure required to develop this conditions and the information on the physical nature and forms of the metals (does pulmonary fibrosis occur after residing next to sites with aluminum in the soil?) involved. Indications of whether the materials were neat or as present in soil, preferably at regulated hazardous waste sites, and other salient details should be added here. For materials like benzene, the magnitude and nature of the exposures (e.g., *Blood* 4: 837-841, 1974; *Acta Haematol. 55:* 65-72, 1976; *Environ. Res.* 23: 181-190, 1ForF980; *Am. J. Ind. Med.* 7: 395-402, 1985; *Br. J Ind. Med.* 44: 124-128, 1987; *N. Engl. J Med.* 316(17): 1044-1050, 1987) and it is important to distinguish between exposures to a single material in fuel (e.g., *Br. J Ind. Med. 50:* 56 I569, 1993; Ibid 50: 549-560, 1993) as contrast to exposures to the pure material and mixed exposures *(J Occup. Med* 25: 685-692, 1983; Ibid 24: 203-212, 1982; Ibid 21: 167-174, 1979; Ibid 21: 367-370, 1979; *Am. J Epidemiol.* 118: 526-542, 1983; *Br. J Cander* 43: 77-84, 1981*; Occup. Environ. Med.* 52: 380-384, 1995). For all materials discussed in the toxicology profiles (e.g., benzene), the magnitude and nature of the exposure and the exact disease (e.g., acute myelogenous leukemia) should be specified.

Response: The issue of toxicity profiles was raised at several meetings held prior to the preparation of the draft final RI report. At the risk assessors' meeting held on September 14, 1995, it was agreed that a major rewrite of the toxicity profiles would not be an efficient use of resources, but that fallacies and omissions in the current profiles would be corrected. This approach was reiterated at the Remedial Project Managers and Base Realignment and Closure (BRAC) cleanup team (RPM/BCT) meeting on November 6, 1995. At the April 4, 1997, meeting to discuss agency comments received on the draft RI report, it was once again agreed that the toxicity profiles would not be expanded nor substantially revised for the revised BHHRA.

It is the Navy's understanding that, based on the meetings detailed above, agency consensus had been reached on the content of the toxicity profiles.

29. **Comment:** **Page G-1-59. It is this reviewer's understanding that PCDD were present in the older formulations of PCB oils (ATSDR TP-92/16). It would be most helpful here to discuss all potential source material of PCDD and to provide specifics (e.g., chloracne) of known clinical consequence of PCDD/PCDF exposure in humans. Where major review articles and books, including**

discussions of environmental fate and transport (e.g., extent of soil adsorption by lithology), which have bearing on the toxicology of these and other chemicals with Navy toxicity summaries, please include that information here.

Response: Please see response to specific comment number 28.

30. **Comment:** **Page G- 1-62. Please indicate that no epidemiologic studies of individual PAH are available, as such are always present in mixtures (e.g., coal tar pitch). For all toxicity summaries, please indicate whether the referenced health consequence is due to controlled application (e.g., skin painting, dietary feeding, inhalation bioassay) of neat material or material as present in a soil matrix. Please expand discussions, with references to published studies of the influence of soil adsorption on bioavailability and associated toxicolologic consequence. For all chemicals discussed, please include structural formula, chemical structures and discussion of salient physical properties (e.g., vapor pressure) as relates to the toxicology of the material. For all substances with bibliographic citation appealing in volume IV, please cite the applicable reviews in the body of the profile. Where statements like "Confidence in each of the RfDs is low", please indicate who has made this conclusion (the Navy? U.S. EPA? DTSC?) and what such judgment means for the site assessment made here.**

Response: Please see response to specific comment number 28.

31. **Comment:** **Page G-1-68. For all abbreviations (e.g., TCDF, 2,4,5-T, 2,4,5-TP), please spell out the complete name and, for even very short entries, please include citation to available major published review articles on the chemical of interest.**

Response: The complete name of TCDF is given in the toxicity profile for polychlorinated dibenzodioxins and dibenzofurans. The complete names of 2,4,5-T and 2,4,5-TP are given in the toxicity profile for chlorinated herbicides. Citations to published articles are also given in the individual toxicity profiles.

32. **Comment:** **Page G-1-73; G-1-75. Please add a discussion of petroleum weathering and cited applicable ATSDR references in the body of the text. Please delete the extraneous entries made on page G-1-75.**

For PCE and TCE, please add a diagram (e.g., *Appl. Environ. Microbiol.* 49(5): 1080-1083, 1985) of environmental reductive dehalogenation and a complete discussion of the conditions under which this occurs. Toxicologic summaries of the decomposition products (again, citing ATSDR review documents as available) should be included (e.g., 1,1 -DCE, 1,2-DCE, VC). While the authors list the IARC and ATSDR documents on pages G-1-82 to G-1-86, no mention of same is given in the applicable sections of the main text.

Response: Please see response to specific comment number 28.

33. **Comment:** **Attachment G-2. Tables G-2-1 to Table G-2-20, Table G-4-21, Table G-4-22. For each of the calculation tables, provide rationale in an accompanying brief text the justification [and reference(s) as applicable] for the input parameters selected. For example, in Table G-2-1, why was a drinking water Pb concentration of 6.3 ppb used? How was the lead soil concentration of 11.7 ppm selected? What are the source data for airborne dust, lead in dust, references/data on soil ingestion rates, soil contact, water and food ingestion rates? How was the 9.7 ppb inorganic Pb in the diet derived? Footnotes to each of the tables should be added to make the tables self-explanatory. Details of the "depth interval" should be provided along with an explanation of the significance - and the confidence the reader can place - in the "output" parameters (e.g., What does the "50% percentiles" mean? What is a 'typical' child and who defines that parameter? Why is soil ingestion 0.05 and 0.65 for children?) should be supplied.**

Response: The exposure assumptions used in the blood lead model are presented in Section 4.4 of Appendix G.

34. **Comment:** **Attachments G-3 and G-4. For each entry listed "NE", a footnote or explanation should be added to explain the reasons for lack of evaluation. Why is inorganic Pb listed in this section? Since this is redundant, cannot inorganic Pb be handled in a general preface explanation to Attachment G-3?**

On page G-3-xiii, please provide explanations for the terms "central tendency exposure" and "Reasonable maximum exposure" - what do these terms mean to the lay reader?

Response: The acronyms are defined on pages G-3-xiii and G-4-iv. Lead is not evaluated in Attachment G-3 or G-4; however, the tables in Attachments G-3 and G-4 list the detection frequency of lead.

The terms "CTE" and "RME" are defined in Section 3.1 of Appendix G, and are explained in more detail in Section 6.2 of Appendix G.

35. **Comment:** **Attachment G-4. A preface and explanation should be added here to simplify a) why the section was prepared and submitted, b) the underlying assumptions and how the calculations were performed and c) how the results compare to those for other Bay Area metals background values. Since one of the primary determinants of metals toxicity is the physical form of the material (dictating the oral, dermal and inhalation toxicity), what data are used here to account for TI-specific metals bioavailability?**

Response: The hazard indices and cancer risks for ambient and background metals presented in Attachment G-4 were developed using the same risk assessment methodology used throughout the RI report. The exposure assumptions and toxicity criteria used are presented in the text of Appendix G and in Tables G-1 through G-6.

36. **Comment:** **Table G-4-21; Table G-4-22. What significance should be attached to the blood Pb values (e.g., 10.7, 12.4, 13.6 micrograms/dL) calculated for the pica child under "ambient" levels at YBU and TI" Reference to applicable sections of the body of the text, footnote, preface or an overall summary section should be added to explain the relevance of the adult, "typical" and "pica" child assumptions, relevance and significance for benefit of the site risk manager, the restoration advisory board and the public.**

Response: The blood lead model is discussed in Section 3.7 of the RI report and Section 4.4 of Appendix G.

REFERENCES

Lee, C.H. 1969. Case History 2. "Treasure Island Fill." *Geologic and Engineering Aspects of San Francisco Bay Fill.* California Division of Mines and Geology. Special Report 98.

RESPONSE TO DTSC - HERD COMMENTS ON VOLUME 5 OF THE DRAFT FINAL ONSHORE REMEDIAL INVESTIGATION REPORT, NAVAL STATION TREASURE ISLAND SAN FRANCISCO, CALIFORNIA

This document presents the Navy's responses to comments dated February 25, 1998, from the Department of Toxic Substances Control - Human and Ecological Risk Division (HERD) on Volume 5 of the Draft Final Onshore Remedial Investigation Report, Naval Station Treasure Island (NAVSTA TI).

RESPONSES TO DTSC HERD COMMENTS ON VOLUME 5

Specific Comments

1. **Comment:** **Appendix L, Page L-6. The sections, 1.3.1 Biotransformation and Biodegradation and 1.3.2 Bioaccumulation, while providing a strict definition of these processes are so general they tell the reader almost nothing. It would be worthwhile, for example, to summarize those substances found in soil and groundwater that would be subject to these factors. While the authors have discussed subsequently benzene, xylene, ethylbenzene and toluene, there is no discussion of the actual products found at TI including the light and heavy fractions of diesel fuel, other fuels, oils and petroleum hydrocarbons. It appears the authors have omitted any discussion of fuels (other than the aromatics and polynuclear aromatic hydrocarbons) and the very important aspects of petroleum weathering, where the components are biodegradation, selective dissolution and to a very limited extent in the case of heavy fractions (e.g., hydraulic oil marine diesel or Bunker C) volatilization. Biodegradation by aerobic and/or anaerobic microorganisms will usually lead over time to the complete or near-complete removal of the n-alkanes, the low molecular weight aromatics (e.g., benzene, toluene, ethylbenzene and xylene) and smaller cycloalkanes (e.g., cyclohexane). Usually, the n-alkanes are more prone to degradation than the isoalkanes and the cycloalkanes are more resistant to biodegradation than other small molecular weight materials listed here, just as the multi-ring molecules are more resistant than the simple single ring molecules; the actual patterns followed are primarily the result of the nature of the subsurface microbial environment and the availability of nutrients. Just as with biodegradation, selective dissolution of the low molecular weight molecules (e.g., benzene, xylene, toluene, ethylbenzene) is more rapid than that with higher molecular weight constituents.**

   Methods for quantitative environmental fate and transport of petroleum hydrocarbons including Documentation for API's Decision Support System for Exposure and Risk Assessment (1993), American Society for Testing and Materials, Emergency Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites (1994), Massachusetts Department of Environmental Protection Interim Final Petroleum Policy: Development of Health-Based Alternative to the Total Petroleum Hydrocarbon (TPH) Parameter (1994), the related reports UCRL-AR-121762 Recommendation to Improve the Cleanup Process for California's Leaking Underground Fuel Tanks (1995), Senate Bill 1764 Advisory Committee Recommendations Report Regarding California's Underground Storage Tank Program (1996) and related materials (e.g., J. Soil Contam. 1(2): 103-157, 1992; Cleanup Levels for High-Boiling Point Petroleum Hydrocarbons, EMCON, 1995) for the petroleum products themselves - as contrast to the use of 'indicator' chemicals were forwarded to the contractor authors many months ago, but apparently were ignored. Methods for quantitative environmental fate and

transport analyses of petroleum hydrocarbons are not limited to those previously provided, but the risk analysis can draw from examples provided by Illinois Environmental Protection Agency, "Tiered Approach to Cleanup Objectives" Guidance Document, Springfield, 1996), Michigan (Michigan Department of Environmental Quality, Risk-Based Corrective Action at Leaking Underground Storage Tanks, 1995), Ohio (Ohio Bureau of Underground Storage Tank Regulations, "Risk Assessment" Guidance Document, Reynoldsburg, 1995), Texas (Texas Natural Resource Conservation Commission, "Risk-Based Corrective Action for Leaking Tank Sites", Austin, 1994) and the U.S. EPA OSWER Directive 9610.17 (March 1995 Use of Risk-Based Decision Making in UST Corrective Action Programs). In order to refine and develop realistic and protective cleanup goals for petroleum products in soil and subsurface waters at NAVSTA TI there is no substitute for such rigorous analyses. In the absence of same, the default benchtop methods apparently relied upon to calculate a 14 parts per million (ppm) soil cleanup concentration for 'TPH' appear to have gained some level of regulatory concurrence, but for materials like diesel fuel it appears the value is unnecessarily restrictive, given the data cited in the methods and reports above.

For example, the low concentrations of benzene, toulene, ethylbenzene, and xylenes (BTEX) in heavy fractions would necessitate a lower theoretical health risk associated with fractions like Bunker C, crankcase or hydraulic oils; however, given the rather unique site specific characteristics of NAVSTA TI (which may be more similar to the Navy's cleanup of military installations in the Aleutian Island), this may not be the case in reference to aquatic receptors. The discussion of weathering should be expanded to include the following points that lead up to a formal quantitative analysis of the fate and transport of all of the different types of petroleum products found at NAVSTA TI; it is expected that the formal fate and transport analyses will reduce the uncertainty associated with a 14.7 ppm "TPH" soil 'cleanup' concentration for the various kinds of petroleum hydrocarbons. Furthermore, it is possible that the soil fuel and oil concentrations (as contrast to the default leaching trials apparently carried out to derive a 3 significant digit "TPH criterion") which can safely be left in place would increase as a result of these efforts.

Response: The objective of Appendix L was to provide a general description of fate and transport processes affecting contaminants in environmental media. Site-specific discussions are provided in chapter on individual sites. The discussion of fuels will be expanded in the final remedial investigation (RI) report to incorporate suggestions from the reviewer. The cleanup goals for petroleum products in soil and subsurface waters at NAVSTA TI are being revised. The reviewer's recommendations on development of realistic and protective TPH cleanup goals will be incorporated in the final RI report.

2. **Comment:** **Fate and Transport of Metals. Of the two classes of materials that are of greatest difficulty at NAVSTA TI, petroleum hydrocarbons and the metals, it is the metals which are most clearly under DTSC regulatory oversight. Among the most important factors in determination of either human or ecological, it is the magnitude of exposure which drives the assessment. While the authors have acknowledged that soil sorption (e.g., arsenic in Section 2.2.2) is an important factor and that soil pH can influence mobility and hence bioavailability, only the most general statements are offered. In no case are quantitative data listed or cited which could be used or applied to the various soils at NAVSTA TI (See point 13, Section J, below). It appears**

from the published data that "Weathering" and organic content of the particular soil are of paramount import in determination of a particular metal's bioavailability; the text sections in Appendix L are so brief and so general they offer no real insight or information to the reader which could be used in the quantitative analysis of risk at NAVSTA TI or which can be used to quantify the degree of conservatism inherent in the NAVSTA TI methods an observation mentioned ad nauseam throughout the text. Citation of the results of quantitative laboratory investigations specific to NAVSTA TI and/or results published in the open literature and how those data can be applied to dealing with the metals found at NAVSTA TI - particularly as regards ecological impact of metals arising from Navy activities - should be made very clear in this section.

Response: Necessary text will be added to the text of the final RI report.

3. **Comment:** **It is not clear from the outset that elimination of Sites 2, 4, 6, 13, 14, 15, 16, 18, 19, 20, 22, 23, 25, 26, and 27 considered the ecological impact of materials present in these locations prior to their elimination from further consideration in the Remedial Investigation Report.**

Response: Generally, the terrestrial habitat of Treasure Island (TI) is of poor quality for wildlife species. The island is composed predominantly of urbanized areas covered by buildings, pavement, lawns, and other landscaped areas. Lawns, in general, provide poor habitat and the landscaped areas contain mostly non-native species. Disturbance from vehicular traffic and general human presence also reduces the quality of the habitat to wildlife species. Because of these factors, TI was not considered for ecological risk assessment for terrestrial receptors (PRC 1994a, b). The ERA was instead focused on the Yerba Buena Island (YBI) Sites 08, 11, 28, and 29.

Appendix J

4. **Comment:** **Page J-1: Reference to DTSC (1996) does not appear in the bibliography (p. J-126 to J-127). Further, as the analysis to YBI only, how does one account for transport of fuel oils and other chemicals of potential concern (COPC) from TI to the Bay and the potential ecological consequence there?**

Response: The DTSC 1996 reference will be added to the reference list in the final RI report.

The offshore habitat of NAVSTA TI was evaluated as part of the RI for the Offshore Sediments Operable Unit (TtEMI 1999). Pathways assessed for chemical mobilization and transport from NAVSTA TI to the bay include: groundwater-surface water interactions, surface transport, and biotic transport.

5. **Comment:** **Section 4.0: In order to complete the bibliography, the names of all authors of each publication listed should be included as contrast to listing only "and others".**

Response: Comment noted. In future ERAs, the reference list will include the names of all authors of each publication listed. For ease of reading; however, "and others" will continued to be used in text citations.

6. **Comment:** **Page J-12, Section 1.2.4: Some justification or citation to either primary studies, published literature reviews, or regulatory guidance document(s) should be provided to substantiate the default BMF of 1 and 0.1. As written,**

the reader is unable to determine whether these assumptions are reasonable or whether they lead to accurate or to over- or under-estimates of exposure and associated health risk for the various COPCs, having widely varying lipophilicity and other salient chemical parameters. It would be most helpful to list here the COPC for which the default BMF values were considered necessary.

Response: Where biomagnification factors (BMF) could not be derived from the literature, default values were used. The high and low default BMFs (1.0 and 0.1) were chosen to bracket the range of reasonable BMFs. These are conservative assumptions for metals, as supported by Alloway and others (1990), the National Academy of Sciences (1980), and Marquenie and others (1987).

The text in the final RI report will be modified to include the following:

> The high default BMF was 1, and the low default BMF was 0.1 (Alloway and others 1990; NAS 1980; Marquenie and others 1987). Default soil to plant BMFs were used for barium, beryllium, cadmium, cobalt, silver, and thallium. Default soil to invertebrate BMFs were used for barium, beryllium, cadmium, cobalt, nickel, silver, thallium, and naphthalene.

7. **Comment:** **Page J-17: While the authors have considered PAH and related materials as indicator COPC for petroleum products, there is no indication that leaked fuels, oils, and other petroleum products (including the larger molecular weight materials found in weathered material) have been evaluated at either YBI or TI.**

Response: Toxicity testing of petroleum-contaminated soils included two bioassays (using abnormal development tests *Mytilus edulis* and *Strongylocentrotus purpuratus*) used to calculate chronic "threshold" values for TPH that are protective of ecological receptors in the bay. The petroleum screening levels used for groundwater and soil are conservative estimates of the potential impact of TPH contamination to the bay. They do not take into account any dilution or attenuation factors that would decrease the TPH concentrations as contamination migrated to the bay. The screening levels assume that contamination is located adjacent to the ecological receptors in the bay. Therefore, it is anticipated that the farther inland a site is located, the less significant the impact to the bay will be, and a higher screening level should be applied.

Appendix N of the draft final RI report presents the results of the sampling and toxicity testing of petroleum-contaminated soils and the derivation of threshold values.

The results of the Offshore Sediments Operable Unit RI report (TtEMI 1999) indicate that TPHs have not migrated to the bay. TPHs were below the detection limit in all samples analyzed. Additionally, polynuclear aromatic hydrocarbons (PAH) constituents detected in offshore sediments were below conservative screening levels, such as San Francisco Bay ambient (RWQCB 1998) and ER-Ls (Long and others 1995).

8. **Comment:** **Page J-17, lines 11-12 from top: From the text as written, it appears that background data on inorganics were not considered in the ecological assessment? If such was not the case, then a brief discussion of how "background" metals concentrations were handled in relation to the ecological aspects of YBI and TI would be helpful here.**

Response: The Draft Final RI report identified inorganic COPCs based on a comparison to ambient metal concentrations for TI and background metals concentrations for YBI. Because the habitat quality of TI is poor (see Section 3.8 of the RI report), the ERA focused on YBI Sites 08, 11, 28, and 29. Although Site 11 is located at YBI, site metals concentrations were compared to the TI ambient concentrations since the geology at Site 11 is similar to the artificial fill at TI.

At YBI, the upper levels of background concentrations were estimated using a nonparametric formula to calculate the 80th percent lower confidence limit on the 95th percentile (LCL80,95). Recommended by DTSC, the LCL80,95 is used for data sets with less than 50 data points. The calculated background concentrations for metals at YBI are listed in Table 3-3 of the draft final RI. The ambient levels for TI were estimated using distribution-dependent formulae to find the strict 95th percentile. The calculated ambient concentrations for metals at TI are listed in Table 3-4 of the draft final RI.

A more detailed description of the methodologies used to establish ambient and background concentrations was presented in Appendix F of the draft final RI.

9. **Comment:** **Page J- 19: Please cite the names of the "various bibliographic databases" that were searched electronically (or refer the reader to Section 2.1 or appropriate location in the documentation).**

Greater detail should be provided on the "consensus-building technical panel" or "workgroup" including its composition, goals, operating procedures and work products. What, specifically, does the sentence, "Additional data are continually being published by empirical researchers and reviewers," have on the present analysis? Is not this statement as true for the human health risk assessment as it is for the ecological aspects of YBI and TI?

Response: The text on page J-19 of the final RI report will be revised as follows: "To compile the core data set, various bibliographic databases were searched (see Section 2.1)."

The toxicity reference values (TRVs) were developed by the Navy in consultation with the U.S. Environmental Protection Agency (EPA) Region 9 Biological Technical Assistance Group (BTAG); this group includes representatives from the U.S. EPA, National Oceanic and Atmospheric Administration (NOAA), U.S. Fish and Wildlife Service (USFWS), DTSC, Regional Water Quality Control Board (RWQCB), and California Department of Fish and Game (CDFG). The main objective of the work group was for the Navy and regulatory and trustee agencies to reach consensus on regional TRVs in order to assess risk to higher trophic level receptors from site contaminants at Naval installations. As a consensus-building technical panel, the work group (composed of the Navy and BTAG) reviewed and discussed literature and agreed upon high and low TRVs for each COPC during a series of meeting held during 1996; meeting minutes are included in the TRV document (see Appendix D, EFA West 1998). Section 2.0 of Appendix J in the final RI report will be modified to include a reference to the TRV document (EFA West 1998).

The text indicated that additional data are continually being published by empirical researchers and reviewers to emphasize that the TRVs were based on the best *available* information at the time, and that as new data become available changes in the TRVs or their interpretation may be warranted.

10. **Comment:** **Page J-2 1: Please list or describe the criteria by which a study design is deemed of "high quality"; what are the criteria for "adequate sample size"? Please describe what is meant by "well-justified" conclusions? What constitutes an "explicit analysis of uncertainty'? Does the latter encompass or require a formal quantitative uncertainty analysis? In Section 2.3, were all "low quality" studies eliminated from further consideration? Is a sample size of 2 considered "adequate" and, if so, under what conditions would that be considered "acceptable" since common statistical methods yield very unstable results with so few observations.**

Response: TRVs and the methodology used to derive them are described in detail in "Development of Toxicity Reference Values for Conducting Ecological Risk Assessments at Naval Facilities in California" (EFA West 1998). This document includes a discussion of the quality criteria used. Section 2.3 of Appendix J in the final RI report will be modified to include a reference to the TRV document (EFA West 1998).

11. **Comment:** **Page J-23: How was the "overall strength of the core data set" determined? Specifically, was a formal weight of evidence paradigm applied, was a qualitative strength of evidence observation relied upon, or was a statistical approach employed using all published data (e.g., meta-analysis)?**

Response: See response to DTSC-HERD Appendix J Specific Comment number 10.

12. **Comment:** **Section 2.5.3: Allometric scaling includes adjustment for body surface area (e.g., H. Boxenbaum interspecies scaling, allometry, physiological time and the ground plan of pharmacokinetics. J *Pharmacokinet. Biopharm.* 10(2): 201-227, 1982) rather than simple adjustment on a body weight basis. From the text as written, there is no compelling rationale given on page J-27 for selection of the Opresko equation as contrast to scaling of metabolism and other physiologic parameters by surface area or other allometric parameter.**

To alleviate the difficulties and potential discrepancies encountered in the scaling method selected, it would be helpful here to refer the reader of this section to the uncertainty discussion appearing in Section 3.2.2.

Response: The allometric scaling approach is further detailed in the TRV document (EFA West 1998). Section 2.5 of Appendix J in the final RI report will be modified to include a reference to the TRV document and a reference to Section 3.2.2 of Appendix J.

13. **Comment:** **Section 2.5.5: This section should explain sigmoid and U-shape dose-response relationships for essential elements.**

Response: The following sentences will be added to Paragraph 1, Page J-31.

"Designed feeding studies frequently characterize a hormetic response to chemicals having nutrient properties at low concentrations, resulting in an initial enhanced (and beneficial) biological effect at low concentrations. Then. as concentration increases, toxic effects associated with the chemical are expressed at higher doses (Amdur and others 1991). Hence the classical sigmoid dose-response curve characteristic of chemicals having no nutritional role is less likely to be observed, and instead a hormetic response at low exposure concentrations yields a 'U-shaped' dose response curve."

14. **Comment:** **Section 2.6: The concept of naturally-occurring background soil/rock concentrations of the elements listed as problematic here (e.g., barium, beryllium, cobalt) should be taken into account. As reported in previous reviews of Volumes I-IV, the failure to compare NAVSTA TI concentrations of metals to Bay Area Regional background had led to numerous difficulties in identification of COPC both for the human and now the ecological assessment of risks.**

Response: The overall investigative approach for COPC selection was to compare bulk chemistry data for soil to site-specific background levels (Appendix F, draft final RI). Essential nutrients present at requirement levels and chemical concentrations less than background were excluded from further assessment on a site-by-site basis. Inorganic chemicals at concentrations that exceeded background or ambient concentrations in more than 10 percent of the samples on site were included in the ERA, as were all organic chemicals. However, based on the reviewers comments, a comparison of site concentrations to the range of off-site reference concentrations in bay area soil and rock for inorganic COPCs, where available, will be included in the risk characterization. See also response to DTSC-HERD Appendix J Specific Comment Number 8.

15. **Comment:** **Section 2.7, Table J2-2: There is no discussion of whether a linear or sigmoid dose-response relationship (implied by the use of an uncertainty factor applied to a NOAEL) for benzo(a)pyrene and related carcinogens is appropriate in the present context.**

Response: The data used to derive TRVs were reviewed by the BTAG TRV working group, including representatives of the U.S. Navy and its contractors, EPA, NOAA, USFWS, DTSC, CDFG, and RWQCB. As a consensus-building technical panel, the work group reviewed and discussed literature and derived high and low TRVs for selected chemicals in working meetings. All TRVs are part of a regional TRV database appropriate for use across installations.

Methods that were used to address uncertainty in the work group's derivation of TRVs include: (1) application of an uncertainty factor (UF) of 10 to adjust lowest observed adverse effect level data to no observed adverse effect level (NOAEL) data when NOAEL data were not available, (2) application of a UF of 10 if the exposure duration is subchronic, (3) allometric conversion to convert doses from test organism to equivalent doses for assessment receptors, and (4) designation of relative levels of confidence based on the quality of the data set for each TRV.

TRVs and the methodology used to derive them are described in detail in "Development of Toxicity Reference Values for Conducting Ecological Risk Assessments at Naval Facilities in California" (EFA West 1998). Section 2.7 of Appendix J in the final RI report will be modified to include a reference to the TRV document (EFA West 1998).

16. **Comment:** **Section 2.7: The major problem here concerns adjustments for bioavailability for the situation at NAVSTA TI in relation to the studies cited in the text; for example, the gastrointestinal bioavailability of cadmium chloride, zinc sulfate, the salts of cobalt, mercury, lead acetate, thallium acetate, and chloride (rat poisons) when delivered in the drinking water is essentially complete, whereas the cobalt, cadmium, and mercury occurring at NAVSTA TI is apparently part of the native rock (where it is fixed as part of the mineral structure) or perhaps present as incidental salts or the highly insoluble oxides complexed in soil. There appears to have been no adjustment made for bioavailability for cadmium or the other metals and metalloids classified as COPC at NAVSTA TI? What bioavailability adjustment for the physical form of Pb in the soil matrix compared to that associated with Pb acetate in the studies cited here? All of these factors lead to an overestimation of the toxicity of these materials (e.g., "The low TRV is probably (?) more conservative than necessary, p. J-48) and consequent exaggeration of, human and ecological risk calculated for NAVSTA TI.**

As a case in point, the bioavailability of arsenic in soil is reduced 30-fold compared to that for the neat compound as a water soluble salt; the duration of soil contact, the concentration of organic matter and the amount of clay determine its bioavailability. Arsenic added to clay soil was 85% less bioavailable than arsenic alone *(Toxicol Sci.* 42(1S): 391, 1998); adjustment for these findings reduces the actual exposure to the organisms question and can explain the failure to observe adverse environmental and human health consequence in spite of the concentrations of the metal or metalloid measured on site or in relation to U.S. EPA default preliminary remediation goals (PRG) values which make no such corrections.

Response: BTAG/Navy were aware that many of the laboratory studies used to derive TRVs were based on metal forms more bioavailable than are found in the field. The bioavailability of metals in sediments at NAVSTA TI is expected to be much lower. Bioavailability is assessed in the interpretation phase of the ERA, in which chemicals that are bioavailable or potentially bioavailable to receptors in nature and a variety of physical and chemical factors that affect bioavailability overall are evaluated.

The Navy is considering re-evaluating the lead TRVs based on concerns that the number is too conservative; selecting a more appropriate study than lead acetate in drinking water would reduce the conservatism and overestimate of risk that currently exists with lead TRVs.

17. **Comment:** **Page J-51: Why are studies on methyl Hg cited here? All previous NAVSTA TI volumes reviewed previously have presented data measured as inorganic Hg, not as any of the organic forms; is NAVSTA TI contaminated with methyl Hg or are the site characterization data inadequate in that no distinctions were made in soil and groundwater Hg quantitative analyses?**

Response: Samples collected at NAVSTA TI were analyzed for total mercury, but not for organic mercury. As stated in the text, methyl-mercury and other organomercurial compounds are far more toxic and bioaccumulative than is inorganic mercury. Both the high and low TRVs used in the food-web modeling for mercury are based on the more toxic methyl-mercury form (EFA West 1998). Since hazard quotients (HQs) were only slightly elevated above 1, additional effort on identifying the form of the mercury is not warranted.

18. **Comment:** **Section 2.7.8: This reviewer cannot concur with assessment of either ecological or human health risk of spilled fuels, oils or other petroleum products based solely on an "indicator chemical" such as naphthalene. No assessment of ecological or human health risk associated with the actual materials (primarily weathered diesel fuel and other related oils and petroleum products) spilled, leaked or otherwise released to soil and groundwater at NAVSTA TI has been performed.**

Response: See response to DTSC-HERD Appendix J Specific Comment Number 7.

19. **Comment:** **Section 2.8: Due to failure to compare NAVSTA TI soils metals concentrations to the range of Bay Area background concentrations of the naturally occurring elements, substances like barium, beryllium, cobalt, and copper have been retained as COPC for the present assessment whereas the concentrations of these elements are consistent with the range of background concentrations for Bay Area soil and rock.**

Response: The overall investigative approach for COPC selection was to compare bulk chemistry data for soil to site-specific background levels (Appendix F, draft final RI). Essential nutrients present at requirement levels and chemical concentrations less than background were excluded from further assessment on a site-by-site basis. Inorganic chemicals at concentrations that exceeded background or ambient concentrations in more than 10 percent of the samples on site were included in the ERA, as were all organic chemicals. However, based on the reviewer's comments, a comparison of site concentrations to the range of off-site reference concentrations in bay area soil and rock for inorganic COPCs, where available, will be included in the risk characterization.

20. **Comment:** **Section 2.8.8: It appears that while toxicity profiles on mercury include discussion of organic mercurials, there was no differentiation of organic mercury from inorganic mercury in the NAVSTA TI site characterization?**

Response: See response to DTSC-HERD Appendix J Specific Comment Number 17.

21. **Comment:** **Section 2.8.9: Since the authors have provided no summary of soil pH at NAVSTA TI in relation to COPC fate and transport, why are discussions about the influence of soil pH on nickel bioavailability to plants included here? Does NAVSTA TI have plant species known to be "hyperaccumulators" of nickel? If so, why aren't these detailed in the present assessment? If not, why are these observations highlighted in the profile?**

Response: The toxicity profiles provide an overview of the toxicological literature reviewed for each ecological COPC (barium, beryllium, cadmium, cobalt, copper, DDT, lead, mercury, nickel, PAHs, silver, thallium, and zinc). Literature on toxicity to plants, invertebrates, amphibians and reptiles, fish and aquatic organisms, and mammals was reviewed; however, the toxicity profiles are not specific to NAVSTA TI.

Although pH was not measured in NAVSTA TI soil samples, the toxicological profile for nickel includes a discussion of major factors contributing to the bioavailability of nickel to receptors in nature.

22. **Comment:** **Page J-95 and throughout: The authors fail to provide any meaningful explanations of exposure (dose) at which the particular adverse effect(s) are observed; for example, "Zinc concentrations (from what matrix and by what route? how high was the dose? what form? neat? in soil?) of pregnant rats and sheep (for what duration? was maternal toxicity observed?) caused increased incidence of hypercuprosis (what is this condition? Would it not be simpler to state that excess copper appeared in the urine: Hypercupriemia or excess copper in the urine: Hypercupremia), stillbirths (late fetal death?) and fetal resorptions (embryonic death?)?); sheep do not resorb dead embryos to this reviewer's knowledge - a consequence limited to common laboratory rodents.**

Are the "toxic effects of zinc" in dogs, cats and horses "as a result of ingesting zinc containing objects" due to the "objects" (i.e., metal pins, wire, bars, nuts and bolts, etc.) themselves or due to documented elevations in circulating zinc concentrations in blood, tissues or other empirical data? Far greater effort to explain accurately the relevance of the information given in the toxicologic profile to the site is needed rather than simply copying an Agency for Toxic Substances and Disease Registry (ATSDR) summary document.

Response: The toxicity profiles provide an overview of the toxicological literature reviewed for each ecological COPC (barium, beryllium, cadmium, cobalt, copper, DDT, lead, mercury, nickel, PAHs, silver, thallium, and zinc). Literature on toxicity to plants, invertebrates, amphibians and reptiles, fish and aquatic organisms, and mammals was reviewed; however, the toxicity profiles are not specific to NAVSTA TI. Although not site-specific, the TRVs were developed for use across Naval installations, and thus were employed in the assessment of risk to terrestrial receptors at NAVSTA TI. Studies used to derive the high and low TRVs for birds and rodents for each COPC are discussed in detail in Section 2.7. Included are detailed descriptions of exposure for each TRV and COPC.

23. **Comment:** **Page J-98: The authors should compare Bay Area naturally occurring background concentrations (barium, beryllium, cobalt) and Bay Area/California urban background anthropogenic (e.g., PAH) concentrations of COPC prior to concluding that risk assessment for these materials ("they could not be evaluated") is necessary in the first place. For example, it appears that the soil lead found at Site 08 (11.6-90.5 ppm) is consistent with that found naturally (e.g., 11.8 ppm Presidio of San Francisco Beach-Dune; 6.8-16.1 ppm Scott, 1991) and less than that commonly found due to its ubiquitous anthropogenic presence in the Bay Area (e.g., 195-567 ppm; Am. Ind. Hyg. Assoc. J. 54: 557-559, 1993).**

Response: The overall investigative approach for COPC selection was to compare bulk chemistry data for soil to site-specific background levels (Appendix F, draft final RI). Essential nutrients present at requirement levels and chemical concentrations less than background were excluded from further assessment on a site-by-site basis. Inorganic chemicals at concentrations that exceeded background or ambient concentrations in more than 10 percent of the samples on site were included in the ERA, as were all organic chemicals. However, based on the reviewers comments, a comparison of site concentrations to the range of

off-site reference concentrations in bay area soil and rock for inorganic COPCs, where available, will be included in the risk characterization.

24. **Comment:** **Pages J-104 and J-109: Please compare the barium concentrations listed to both the immediate NAVSTA TI range of "ambient" and "background" concentrations and to the range of off-site reference ("background") concentrations of this element in Bay Area soil and rock (by lithology where available) prior to making calculations concerning ecological risk.**

Response: Barium concentrations will be compared to NAVSTA TI ambient and background levels and to the range of off-site reference concentrations in bay area soil and rock before making conclusions concerning ecological risk.

25. **Comment:** **Page J-105, J-106. Please compare the thallium concentrations used in the deer mouse calculations to both the immediate NAVSTA TI range of "ambient" and "background" concentrations and to the range of off-site reference ("background") concentrations for this element in Bay Area soil and rock (by lithology where available) prior to making calculations concerning ecological risk.**

Response: Thallium concentrations will be compared to NAVSTA TI ambient and background levels and to the range of off-site reference concentrations in bay area soil and rock before making conclusions concerning ecological risk.

26. **Comment:** **Sections 3.1.3.3 and 3.1.4.3: Per EPA/540/1-89/002, Section 5.7.4, Page 5-19, December 1989, please compare the lead concentration range listed here to: a) native Bay Area soil background concentrations (e.g., 6.8-16.1 ppm, C.M. Scott, 1995 attachment; 8.9-21.5 ppm LBNL, 1995; 1.6-11.8 ppm Colma formation, Presidio of San Francisco) and b) anthropogenic concentrations commonly encountered at other areas in San Francisco and throughout the Bay Area (e.g., *Appl. Occup. Environ. Hyg.* 8(4): 217-220, 1993). It is important in the present context to delineate here the soil depth at which the elevated concentrations (e.g., 1120 -3710 ppm) were encountered and "whether or not these levels are independent of, contributed to, or are the direct result of Navy activities, particularly for lead found in the vicinity of the on- and off-ramps of the Bay Bridge.**

Response: Lead concentrations will be compared to NAVSTA TI ambient and background levels and to the range of off-site reference concentrations in bay area soil and rock before making conclusions concerning ecological risk. Soil depths will also be delineated.

Appendix M

27. **Comment:** **Page 9, Section 5.0 Selection of Constituents for Modeling. While the authors have provided the results of AT 123D and SESOIIL modeling of the indicator chemicals benzene, toluene, ethylbenzene and phenanthrene in order to fulfill the need to determine environmental fate and potential movement of these substances from NAVSTA TI into groundwater and then potentially into the San Francisco Bay, the method of choice used does not take into account the fact that with the heavy oils and even lighter fractions like diesel there is very little (and in some cases none) of any of these materials in the petroleum fractions at the outset:**

Comparison of Benzene and Alkyl Benzene Content
of Diesel Fuels Derived from Petroleum and Shale Oil

	Concentration in fuel (mg/g)[a]				
	Petroleum			Shale	
		1914		4801	
		DOD		Geokinetics	4610 Paraho/
Compound	1910 Phillips	Reference	DF-2-1 DIO	Suntech DF-2	SOHIO DFM
Benzene	0.026	0.082	0.048	0.01	0.027
Toluene	0.27	0.93	0.69	4.7	0.25
Ethyl benzene	0.17	0.43	0.39	0.26	0.20
m- and p-Xylenes	1.3	2.0	2.5	1.0	0.66
Styrene	<0.04	<0.02	<0.05	<0.06	<0.02
o-Xylene	0.42	0.78	0.85	0.32	0.24
i-Propyl benzene	<0.1	<0.2	IR	-	IR
n-Propyl benzene	0.30	0.40	0.48	0.15	0.12
1,3,5-Trimethyl benzene	2.0	0.90	2.4	0.87	0.43
4-i-Propyl toluene	0.26	0.03	IR	IR	IR
n-Butyl benzene	0.31	0.46	IR	IR	IR

[a] IR = incomplete resolution prevented measurement.

Adapted from Griest, W. H. *et al.: Comparative Chemical Characterization of Shale Oil- and Petroleum Diesel Fuels.* DE86003310, Oak Ridge National Laboratory, Analytical Chemistry Division, Oak Ridge, TN (1986).

However, these petroleum products can have considerable ecological and human health impact provided exposure, route and duration are appropriate. Attached please find a human health risk assessment for Bunker C which was produced in an effort to address the problem stated in the top sentence appearing on Appendix M, page 9. It is recommended that the authors not conduct risk assessment for chemicals that were never actually present to any degree in the petroleum product(s) actually used,

spilled or released at NAVSTA TI, but that analysis of the toxicology of the materials actually released or otherwise used (commonly known as the 'whole fuel' approach) be used here to obtain a more accurate picture of the possible toxicological and ecological consequences of the spilled oils and fuels.

Response: The "whole fuel" approach is currently used for TPH fate and transport modeling at Site 12. The findings and results of this modeling and application to other sites will be presented in the text of final RI.

Summary

28. Comment: **Given that the petroleum at NAVSTA TI represents a pervasive problem and that benzene drives the human risk assessment in most instances at these petroleum sites, it is the case of benzene (which should either be summarized here or perhaps in a more relevant human health risk summary section in previously reviewed volumes), it is important to note here: The 1993 World Health Organization (WHO) Environmental Health Criteria document [International Programme on Chemical Safety. 1993. Environmental Health Criteria 150. Benzene. World Health Organization, Geneva] concludes: There is no direct evidence that 8 hour time-weighted-average (TWA) exposures below 10 ppm in air result in an increased risk of leukemia and that TWA exposure of 1 ppm (3.2 mg/m3) for 8 hours/day for 40 years has not been statistically associated with any increase in death from leukemia (see J *Toxicol. Environ. Health* 36: 177-231, 1992 and references therein). There is a significant increased risk of leukemia following exposures greater than 50 ppm (see *Risk Analysis* 16: 833-840, 1996, for review). Conclusions about benzene leukemogenic potency other than those listed in the publications cited here are simply conjecture based on the default assumptions which underlie the U.S. EPA and Cal/EPA linearized multistage model utilized to derive the q 1* value used in the present NAVSTA TI assessment. While the Navy is compelled by current DTSC and U.S. EPA policy to utilize default q 1* values, a formal uncertainty analysis under the provisions of EPA/600/P-92/003C (reviewed in *Fundamental and Applied Toxicology* 37(l): 16-36, 1997) and a complete discussion of the underlying assumptions about linearity where the molecular biology and pharmacokinetics of benzene-induced acute myelogenous leukemia (which is the only form of leukemia linked to occupational benzene exposures; see *Risk Analysis* 14: 148-154, 1994; *Crit. Rev. Toxicol.* 24: 177-209, 1994); result in the interplay of a chain of non-linear events (see *Environmental Health Perspectives* 104: 1239-1246, 1996; *Eur. J. Haematol.* 60: 111-118, 1996). Without comprehensive discussions of the molecular toxicology and dose-dependent pharmacokinetics of the substances found at NAVSTA TI the impression that is conveyed by the documents as submitted is one of dire health risk rather than the customary and familiar theoretical excess cancer risks that - in the case of benzene as an example – are actually less during NAVSTA TI occupancy than those encountered in daily activities such as riding in a gasoline-fueled automobile.**

It would be wise to compare and contrast the calculated benzene and other COPC exposures that could potentially arise during activity at TI to that received in urban and suburban areas (ambient air, tobacco smoke, air inside automobiles, during vehicle refueling, etc.) and rural areas thought to be pristine (IARC. 1988. Environmental Carcinogens. Methods of Analysis and Exposure Measurement. Volume 10 - Benzene and alkylated benzenes.

IARC Scientific Publications No. 85. Lyon), yet measurable benzene is present there as well. As written, the text treats this and related materials as though these were unique or exotic substances, which can be interpreted by the public as exceedingly dangerous conditions, when in fact, it is the ecological factors which will determine in large part risk management options for NAVSTA TI.

When reading the summary sections of the document (Sections 3.2.1 to 3.4.4), there is no indication which of the great many factors listed are major contributors to overall uncertainty in the NAVSTA TI risk assessments and which are considered of relative minor import. It would be most helpful to provide the reader with a summary of the overall qualitative analysis of uncertainty for both human and ecological risk which would describe which of the factors most influence the conclusions reached and which factors would be expected to contribute relatively little to the overall interpretation of the human and ecological risk calculations made for NAVSTA TI.

Response: Comment noted. A qualitative analysis of uncertainty for human and ecological risk will be added to the summary.

REFERENCES

Alloway, B.J. 1990. *Heavy Metals in Soils*. John Wiley and Sons, Inc. New York.

Amdur, M.O., J. Doull, and C.D. Klaassen. 1991. *Cassarett and Doulle's Toxicology: The Basic Science of Poison*. Fourth Edition. Pergammon Press, New York.

Engineering Field Activities West (EFA West). 1998. "Development of Toxicity Reference Values for Conducting Ecological Risk Assessments at Naval Facilities in California, Interim Final Technical Memorandum." Engineering Field Activity West, Naval Facilities Engineering Command, San Bruno, California. September.

Long, E.R., and others. 1995. "Incidence of Adverse Biological Effects Within Ranges of Chemical Concentrations in Marine and Estuarine Sediments." *Environmental Management*. Volume 19, Number 1. Pages 81-97.

Marquenie, J.M, J.W. Simmers, and S.H. Kay. 1987. "Preliminary Assessment of the Bioaccumulation of Metals and Organic Chemicals at the Times Beach Confined Disposal Site." Buffalo, New York. In Miscellaneous Paper ER-87-6. United States Army Corps of Engineers. Waterways Experiment Station. Pittsburgh, Mississippi..

National Academy of Sciences (NAS). 1980. *Mineral Tolerance of Domestic Animals*. National Academy Press. Washington, D.C.

PRC. 1994a. Ecological Risk Assessment Site Walk Summary for June 3, June 15, and June 22, 1994.

PRC. 1994b. "Final Phase IIA Remedial Investigation Field Work Plan Addendum, Naval Station Treasure Island, San Francisco, California." Department of the Navy, Western Division, Naval Facilities Engineering Command. August 26.

Tetra Tech EM, Inc. (TtEMI). 1999. "Draft Final Remedial Investigation Offshore Operable Unit, Naval Station Treasure Island., San Francisco, California." Engineering Field Activity West, Naval Facilities Engineering Command, San Bruno, California. March.

RESPONSE TO DTSC-HERD COMMENTS ON DRAFT FINAL REMEDIAL INVESTIGATION REPORT APPENDICES J AND O NAVAL STATION TREASURE ISLAND SAN FRANCISCO, CALIFORNIA

This document presents the Navy's responses to comments from the Department of Toxic Substances Control's (DTSC) Human and Ecological Risk Division (HERD) provided by Mr. James Polisini on Appendix J, ecological risk assessment methodology and results, and Appendix O, responses to regulatory comments on the draft remedial investigation report, for Naval Station Treasure Island, dated September 1997. The comments are dated November 4, 1997.

GENERAL COMMENT

Comment: **Our main concern regarding the response to comments is the contention by the Navy and Navy contractors that the potential adverse effects on small mammal populations at some sites is mitigated by emigration from surrounding unaffected populations. We do not agree that this is sufficient basis for a no further action decision at these sites.**

Response: The results of the food chain modeling performed for the RI determined that there are no significant impacts likely to occur to populations of small mammals, as represented by the deer mouse in the model. The model indicated the possibility of some adverse impact from the levels of certain chemicals at the sites; however, the Navy and regulatory agencies have agreed that a small mammal validation study is not necessary. This decision was based on the small size of the sites (that total about 29 acres), the disturbed nature of the sites, continuing disturbance of Sites 28 and 29, and likely remedial action for the landfill at Site 11, as stated in the comments submitted by the DTSC on January 23, 1998 (TtEMI 1998).

The Navy agrees with DTSC's January 23, 1998 statement that small mammal validation studies are not necessary at Sites 8, 11, 28, and 29. The text of the RI document has been revised to reflect that this decision for Sites 11, 28, and 29 is based on the disturbed nature of the sites, the likelihood of continued disturbance of Sites 28 and 29 due to bridge maintenance, and the likelihood of remedial action taking place at Site 11.

SPECIFIC COMMENTS

1. **Comment:** **HERD was not involved in the April 4, 1997 meeting where there apparently was agreement among regulatory agencies that a 'ten percent rule' could be applied to inorganic potential contaminants in selecting the contaminants of ecological concern, as described in the response to specific comment number 3. We know of no other DTSC site in California where this criterion has been applied. We continue to recommend two methods for evaluating inorganic elements for exclusion from further consideration: 1) a comparison with an upper quantile of a background data set; and/or 2) an appropriate statistical test to determine whether the site-specific data are statistically different from an appropriate background data set. The spatial location of any samples excluded must also be evaluated to determine whether the excluded samples represent a localized elevated concentration (i.e., a 'hot spot').**

Response: Comment acknowledged. The criterion for selecting chemicals of concern for any future ecological risk assessments at Treasure Island sites will be determined in consultation with the regulatory agencies. The criterion for exceeding ambient concentrations in more than 10 percent of the samples agreed to for the human health risk assessment will not be used unless it is specifically agreed to for future ecological risk assessments.

2. **Comment:** **The response to specific comments number 8, 15, 19, and 23 misstates the original HERD comment. The original HERD comment began with the phrase 'We do not believe....' The response to comments presents the HERD comment as 'We do believe...' Please correct the HERD comment in the response to comments to accurately reflect our original comment.**

Response: Comment acknowledged. DTSC specific comments number 8, 15, 19, and 23 will reflect the change. See response to general comment number 1.

3. **Comment:** **The response to specific comment number 12 makes reference to the Greek letter M. The original HERD comment was: There appears to be a typographical error where the Greek letter Φ appears where the units are either 'mg/l' or 'µg/l' not 'Φg/L'.**

Response: Comment acknowledged. These typographic errors will be corrected.

4. **Comment:** **We disagree with the response to specific comment number 1 on Appendix J. While the method of estimating the deer mouse tissue concentration based on the total amount of contaminant consumed over six months may be protective for some inorganic elements, it may not be protective for organic contaminants with high bioaccumulation potential. HERD can offer the DTSC risk manager no exact opinion on the contaminants for which this method of estimating bioaccumulation is protective. Therefore, we recommend sampling of soil and deer mouse tissue as the appropriate method for decreasing the uncertainty in the predictive assessment for raptors.**

Response: The 180 day daily dose estimate for the deer mouse, which assumed 100 percent absorption and no depuration over time, is an extremely conservative estimate of the high and low concentrations within vertebrate prey and is considered protective for both organic and inorganic contaminants. However, to decrease the uncertainty in the predictive assessment for raptors, a qualitative assessment will be made to determine what percent retention is likely to be most accurate for each chemical where risk to a receptor is indicated. The literature will be reviewed in order to gain an understanding of the relationship between dietary intake and accumulation of chemicals into rodent tissues as supporting evidence for the modeled body burden that was used to assess risk to populations of raptors.

Because the Peregrine Falcon is an endangered species, effects on the individual may impact the overall population. Thus, additional data were collected during Spring 1999 to better quantify the potential risk to individual Peregrine Falcons. Bird tissue was collected from each site for which potential risk to the Peregrine falcon was indicated (Sites 11, 28, and 29).

5. **Comment:** **The response to comment 1 also states that 'While there may be potential effects on individual mice or raptors, adverse effects will not occur at the population level.' While this conclusion could be supported for the hawk, if additional detail is provided on home range and site-use factors, we do not believe it is appropriate for small mammals. No population studies were made of Treasure Island deer mouse populations, nor is there any reference cited which has studied the number of individual deer mouse, which can be removed from the population without serious adverse effects on the population. We continue to recommend soil and deer mouse food item sampling to decrease the uncertainty inherent in the predictive assessment evaluation of the deer mouse.**

Response: See response to general comment number 1 above.

6. **Comment:** **We disagree with the response to specific comment number 6 on Appendix J. The point of specific comment number 6 was that the risk manager might gain some insight into the contaminants which might be of concern by examining the range of hazard quotients based on the numerically low toxicity reference value (TRV) and the numerically high TRV. For example, a contaminant with a 'low' hazard quotient of 0.9 and a 'high' hazard quotient of 900 would, most probably, deserve more consideration than a contaminant with a 'low' hazard quotient of 0.01 and a 'high' hazard quotient of 10. The 'low' and 'high' hazard quotients for both hypothetical contaminants differ by the same order of magnitude, but the 'low' hazard quotient of the first is closer to unity. This indicates that the distribution of potential hazard quotients for the first hypothetical contaminant has a greater probability of being greater than one and therefore of concern.**

Response: Ranges for both the "best-case" and "worst-case" HQs will be presented in the text of the final ERA. However, comparison of the relative magnitude of the "best-case" and "worst-case" HQ will not be discussed. Comparing relative magnitudes of the "best-case" or "worst-case" HQs for different COCs may be misleading, and it implies a strength in the analysis that may not be justified by the data set or the uncertainties involved. Such comparisons assume that the input parameters for different COCs are similarly based, which may not be true. For example, high and low TRVs (one of the input parameters for the "best-case" and "worst-case" HQs) are not comparable among COCs because of the differences in toxicological endpoints, organs affected, and confidence in the data set used to derive TRVs for each COC. In addition, comparing the "best-case" and "worst-case" HQ for a single COC provides little information beyond the fact that a large difference between the high and low TRVs (or the range of exposure assumptions) for a specific COC resulted in a large difference between the "best-case" and "worst-case" HQ.

7. **Comment:** **Future commercial or residential development of Site 08 is the basis for recommending no further action in the response to comment number 8 for Appendix J. The DTSC risk manager should identify the method which will guarantee that commercial or residential development will definitely occur at Site 08, if future commercial or residential use is the rationale for considering future ecological exposure pathways incomplete.**

Response: Because the reuse plan for Treasure Island has not been finalized, the Navy is not certain that development will occur at Site 8. The main pathway for transfer of contaminants into the food chain at this site is ingestion of contaminated soil and contaminated prey. To eliminate the contaminant pathway for transfer into the food chain, Site 8 will likely require a deed restriction. The restriction will require that development of the site will eliminate the pathway and that a remedial action be conducted, such as installing a cap. As a result, this site will be carried into the feasibility study phase. The document will be revised to reflect this.

Conclusion: **HERD agrees that sampling of red-winged blackbirds or other peregrine falcon prey and analysis of the tissue concentration is appropriate as a validation study for the peregrine falcon. Additional justification based on home range and site-use factors is required to support the selection of no further action for the hawk. Without soil and deer mouse food item analyses HERD cannot provide any guidance regarding whether the no further action alternative is protective of mammals for Sites 08, 11, 28, and 29. We continue to recommend these analyses as outlined in the DTSC guidance for ecological risk assessment.**

Response: See response to general comment number 1 and specific comment number 4.

REFERENCES

Tetra Tech, EM Inc. (TtEMI). 1998. "Validation Study for Sites 11, 28, and 29 Final Work Plan/Field Sampling Plan Naval Station Treasure Island, San Francisco, California." Engineering Field Activity West, Naval Facilities Engineering Command, San Bruno, California. November.

TtEMI. 1999. "Draft Final Remedial Investigation Offshore Operable Unit, Naval Station Treasure Island., San Francisco, California." Engineering Field Activity West, Naval Facilities Engineering Command, San Bruno, California. March.